MEETING STATUS: PUBLIC

LEGISLATIVE ASSEMBLY

PRINCE EDWARD ISLAND

SESSION: 2/62
Motion No: 49
Year: 2005

VERBATIM TRANSCRIPT OF
HOUSE COMMITTEE PROCEEDINGS

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COMMITTEE: SPECIAL COMMITTEE ON CLIMATE CHANGE

Thursday, March 10, 2005

SUBJECT(S) BEFORE THE COMMITTEE:

Further consideration of the topic of Climate Change.

NOTE:

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COMMITTEE MEMBERS PRESENT:	Wayne Collins, Chair Honourable Chester Gillan Andy Mooney replacing Jim Bagnall Helen MacDonald Wilfred Arsenault Richard Brown Carolyn Bertram
ABSENT:	Wes MacAleer
GUEST:	Part I - Ron MacMillan, Q.C., Deputy Minister, Community and Cultural Affairs Part II - Sandra Boswell Part III - Soil and Crop Improvement Association: Tyler Wright and Alan Rennie Part IV - Bill Glen, Resource Inventory and Modeling Manager, Environment, Energy and Forestry
STAFF:	Marian Johnston (Committee Clerk) Erin Swansburg (Committee Assistant)

Special Committee on Climate Change
Thursday, March 10, 2005
2:00 p.m.

Part I - Ron MacMillan, Q.C., Deputy Minister, Community and Cultural Affairs

Wayne Collins (PC) (Chair): Call the meeting to order. The Special Committee on Climate Change with further consideration of the issue of climate change. We have a quorum in attendance at the moment and we're expecting momentarily or within the next short while the arrival of Mr. Ghiz and Mr. Brown as well to join us today. But we do have four presentations today so without further review we're going to move to our first presenter, Mr. Ron MacMillan, the Deputy Minister of the Department of Community and Cultural Affairs. Welcome, sir. Good to have you at the table. Could you introduce your colleague as well.

Ron MacMillan Q.C.: Yes maybe Mr. Chair, I'd just introduce some of the people that are from the department here. There is Jennifer MacLeod as our Communications Officer with our department. I have Larry Avery who is coordinator with the 911 section as well as Danielle Arsenault from that section as well. I have John Barry who is manager of our Municipal Affairs Department and Jack Saunders who is general manager of our Provincial Planning Section and Cindy MacDougall from Emergency Measurers.

Wayne Collins (PC) (Chair): Anyone working at the department today? It's good to see you all here. Thank you for attending.

Ron MacMillan Q.C.: Thank you. I think the fact that we have different people from our different groups here, Chair, shows that our department covers a lot of different aspects in relation to climate change. I certainly thank you and your committee for the opportunity to bring the comments and recommendations of the department here this morning.

I want to begin with a series of photographs which I believe will tell a story of the devastating effects of extreme weather and climate change. These are the Hurricane Juan down at the Charlottetown Waterfront. Those are all at the Charlottetown Waterfront and this is Connaught Square I believe. You'll notice the leaves - because of the time of year there was so many leaves on the trees that it really caught a lot of the wind and that's the Charlottetown Driving Park. Again some trees in around the greater Charlottetown area. I think that one is in Savage Harbour, no North Rustico I'm sorry.

This is Basin Head, this is the December 27th. And this is in Savage Harbour. There use to be a cottage between where we're seeing and the cottage is. This is Panmure Island and this is after our December storm. Basin Head, the bridge at Basin Head which we're all jumped off at one time or other and just looking at this picture at Basin Head, you can imagine the intensity of the storm when it was passing over the wharf area there.

So just quickly to go through those, those photos are some of the damages as we can see. As you can probably imagine, there is a lot of damages that we don't see, certainly at the time anyway and only come to light over time. I guess what I'm talking mainly there is damages to the coast line and to the beaches that occur, especially during a winter storm where nobody would probably be going out for sometime afterwards.

As I mentioned, just in terms of the damages in the Connaught Square around Charlottetown, I mean the time that Hurricane Juan came the end of September, of course the ground was not frozen, the trees were full of leaves. So they would have caught much more wind then they would have during the winter when the leaves wouldn't be there.

Basin Head, the December 27th I believe it was storm that caused so much damage to our coastal areas, there were a number of factors there, high tide, there was a large sea on during the day. Of course, we were in touch continuously with Environment Canada in Halifax. When I first spoke to the - as the day wore on and they told me - referred to it as the sea state. The gentleman on the other end of the line talked about the sea state being six to eight meters, and I said you mean six to eight feet. He says: no, I mean six to eight meters. So I gather - I'm not exactly sure what a sea state is but I'm assuming this is a roll it's on out a distance. So with the high tide, with the winds

driving - coming in on the shore and no ice, no ice layer out there and I suppose that ice if it gets carried up can cause more damage to the shore then if there is no ice. But I think when there is ice, it tends to a certain extent to keep things down a little bit and really, I don't think, any substantial amount of frost in the ground at the time. So it was just one of those situations where all things lined up to result in significant damage to our shoreline as a result of that December storm.

As the Deputy for the Department of Community and Cultural Affairs, I just want to outline some of the comments and recommendations of our department. We have an unique department in the sense that it includes a responsibility for a number of areas in related to climate change. We have our Emergency Measures Organization and Cindy MacDougall is here from that group and that's responsible for our planning, preparation and mitigation in relation to disasters and for coordinating the response.

Municipal Affairs with John Barry as our manager of Municipal Affairs, works closely with the municipal governments to provide support to communities and we act as a government liaison with the federation. Our planning section, Jack Saunders is our manager of provincial planning. Of course, it's responsibility for our land use planning, our property development and our inspections. Under that, planning inspections division also included responsibility for infrastructure programs.

Under emergency management, if we look back - and I'm told that between 1982 and the DFAA or the Disaster Financial Assistant Arrangements Program which is a federal program in which the province participates on a cost sharing basis and I understand that the program came into effect in the early 1970's. Between 1982 and 1999 there were a period of 17 years, we had no claims whatsoever under DFAA. Since 1999 or in the last five and a half years or so, we have had, I understand, five claims in that period of time. So the intensity of the damage, the intensity of claims - more claims, none for 17 years and then five or six in the last six years.

We had the major rainstorm in September of 1999 that caused a lot of infrastructure damage to our highway system in Western PEI. The storm surge in January of 2000. There was another claim in March of 2003 with the Transportation and Public Works again involving infrastructure and then, of course, Hurricane Juan of September of 2003 which caused considerable infrastructure damage to businesses and private homes and environment on our coastal areas especially in the central and the eastern parts of the province. Then in February 2004 we had our blizzard, our so-called White Juan which was in extreme weather condition in the wintertime and then, of course, we had our December 27th storm as well which was particularly hard on our coastlines.

Under our public safety concerns and it doesn't show up there quite as well as it might, but I think this is my recollection of the time is this is the Hurricane Juan which is coming up in a counter clockwise fashion coming in directly. A lot of times the storms seem to track up the coast but this one came in at a slightly different angle. Also, as I understand it, certainly many people here know more than I do that when storms hit land, they tend to slow down and it takes a bit of the impact out of them. But this one came in across Nova Scotia and there is not a lot of land mass between ourselves and sort of the Halifax area if you come directly across. So it didn't seem to slow down too much and in fact, it seemed to increase in intensity as it approached land. As I believe as I recall that had something to do with the temperatures of the water.

There seems to be a little doubt, as I mentioned, that storms are increasing in frequency and intensity so we have to concentrate more and more on various aspects including mitigation. The impact, if we can get more and better data which will allow us to predict more what the impact will be when storms do hit us. Public alerting. There are different public alerting systems. There are some in effect now across the country and there is many others that are being discussed. How do we get the information out to the public in the most effective manner. Then, how do we prepare for and manage the disaster as it is coming and as it is in fact occurring.

This slide is particularly interesting because it shows the vulnerability of our province to the impact of sea level rise. It doesn't show up quite as well as it might there but in terms of the susceptibility to the low lying area, to floods and storms, rising tides, it's outlined in red. You can see PEI, or you can see part of PEI. So a lot of Prince Edward Island is outlined in red on this slide and it certainly does show the vulnerability of our

province and when you think of it, in fact much of Atlantic Canada, especially the coast of Atlantic Canada is sensitive to the effects of sea level rise. The most sensitive areas as I say which are shown in red here are the low lying areas, the salt marshes and the barrier beaches and lagoons. So we do have a lot of sensitive areas in this province. Probably on a land mass basis much more so than the other provinces in Atlantic Canada. So it's very important that we understand our vulnerability to do what we can to reduce the impact of sea level rise and climate change.

If we look towards the future, I guess it goes without saying, that our province needs to take steps to mitigate the impact or the effects of climate change by developing programs and policies that lessen the impact that development has on the coast and adapt to the negative effects brought on by climate change. I think this is the responsibility of all levels of government, provincial, federal and municipal and as well the private sector, a combination of all levels as well as I say the private sector to work on this. I mean in terms of development, we're moving towards a stage in terms of coastline, low lying areas and the questions are coming, where should a development occur and where should it not occur and in terms of where should there be building. We do have some set back requirements now in terms of how close the building and development is allowed - can take place in relation to our shoreline and indeed that's something that will have to be looked at farther.

The concerns, I guess it was probably mentioned some of these before you know, the financial considerations. We have our Disaster Financial Assistance Arrangements Program which is a cost-sharing program between the provincial and federal governments. We have the insurance companies of course that in some cases that is covered by insurance and in some cases, damage is not. Then of course in some cases the damage is borne by individuals. The DFAA Program, for example, does not at this juncture, although it's under review, but it does not cover damages to say cottages, recreational property nor non-essential property. It's my understanding that the DFAA Program was set up to ensure that essential requirements or the basic requirements for life would be covered. So anything of a recreational or non-essential nature would not be covered by the program.

So there is certainly land use planning issues to consider where as I said before, where development should occur and where it should not occur and what type of development we should have. Our coastal vulnerability I guess which at this stage goes without saying, it's very difficult to determine what our - how to measure, how to put a figure on what the losses are to our coastline. We've done just sort of a rough and ready calculation in terms of what's the assessment for tax purposes of our coastline and we've come up with a figure of $958 million. Well that's pretty rough and ready, close to a billion dollars and we know how valuable our coastline is and it seems to becoming more so all the time. Maybe that figure is 2 billion or 3 billion, who knows. I'm sure if you went out and talked to some property owners they would - if you looked at the tax assessment, they would say we certainly wouldn't sell our property for that. It's probably worth twice or three times or four times. Whatever the figure is it's a big number and getting bigger all the time because our coastline is sought after for many purposes and we just throw that in as a figure from an assessment point of view.

Emergency Preparedness, it goes without saying. Emergency measures people have done yeoman service through the last several years since I've been with the department . But we can always strive to do more to better prepare and to better plan the public in the event of storms coming and other factors which will impact upon our province. I think the need for data goes without saying - I mean the more data we have, the more information we have, the better we can plan and prepare.

The department has prepared five recommendations here. I'll go through them very quickly. I think in terms of our recommendation number one - there should be a revisit and a modernization of our legislation. We have to look at - in this regard, we have to look at land use planning, emergency plans and the development that should take place in our coastal area. Two or three of our main pieces of legislation in this area, of course, are the *PEI Emergency Measures Act*, our *Provincial Planning Act* and we certainly would want to involve municipalities in this, I mean all areas of the province. Our land mass - roughly about 30 per cent of our land mass is covered by incorporated municipalities, but 70 per cent is not. So we have to take into account, land use planning, emergency plans that should be required

by all communities including a cooperated municipalities and how and where and what type of development should take place in the coastal areas.

Our second recommendation in relation to policy and again it's just a matter of the policy that we should come forward, the plans, the guidelines that we should come forward in terms of land use planning, our public safety and awareness. I think it's very important that, as we have in the past and continue to do so in terms of involving the community in this, to work with our community partners, whether it be our municipalities or other communities, incorporated municipalities or other communities throughout the province in terms of developing and making people aware of mitigation and other areas. We also suggested here - and while we do have pretty good coordination, I think that an establishment of a provincial committee to take the lead in policy development and climate change would be beneficial.

Recommendation (3) is really talking about and you probably heard about this before from other presenters. It's really talking about a project that we'd like to do. We don't have enough funding provincially to do that but we are working with the federal government to access some funding on this. This is to gather some data. We'd like to really outline the whole coastline of the province and I'm certainly not the technical person to speak about this but as I understand it is to do a three-D modeling of our entire coastline. When we would combine this with digital mapping that's available to us, we would be able to have, be able to predict much more accurately the impact that storms will have on various areas of the province. There is lidar mentioned here which is certainly - I believe another presenter, at least another presenter may have referred to that but is very helpful in that area.

So I think it is important for us to - we would really like to do some work on this project. I think the Province of New Brunswick has already done this with some part of their coastline and they'd have a fairly accurate measurement idea of the impacts that climate change would have on parts of their coastline. We would like to have it done for all of the province.

In terms of recommendation for us, sort of leadership and partnerships and I think this is just a realization that all levels of government as well as the private industry has to be involved in approaching this, gathering more information, making the public more aware, being more involved in emergency management and the coordination of emergency management in the future.

Lastly, I guess is just the last recommendation is just one of mitigation. Doing what we can whether it's through policy, through legislation, whether it's through some type of action that we can take to ensure the protection of our coastal areas as best as possible. The cost of doing nothing I suppose is - continued shoreline erosion, financial costs and public safety concerns as well. So we have to, as I say whether it's developing policy, changing our legislation or attempting to do some things and this is not easy to actually prevent the damage to our shoreline and our coastline.

In some other places I've read articles where they've have barriers, whether that's rocks or trees or whatever it may be. This is given the power and force of nature, this is not easy to come up with things that will prevent damage 100 per cent. That's probably not realistic or possible but I guess what we have to try to do is to try to put in whatever mitigated measures we have that will lessen the damages and lessen the impact upon our citizens.

Just in conclusion, Chair, I'd like to thank you for the opportunity of bringing the comments, recommendations forward for you today for the committee. I'd like to publically thank here the members of our department and without them I certainly wouldn't be here. They have much more indepth knowledge than I have. But Jennifer MacLeod is with me here at the table, and I guess I mentioned the names before, but Larry Avery, Cindy MacDougall, Jack Saunders, John Barry, Albert MacDonald and Danielle Arsenault as well as others from our department have been involved in gathering some of this information for the presentation today.

I think the work of your committee is very important. It's real, it's becoming more real all the time and actually sometimes it's getting a little frightening. I guess I refer back just for a minute, when I was going through the slides last night and I was looking at the Basin Head Wharf and the top of the wharf and how it's just all thrown about like matchsticks. You can sort of get a better feel for, as I said before, the intensity of the storm. Thank

you very much.

Wayne Collins (PC) (Chair): Well, Mr. MacMillan, I want to thank you and all members of your staff for attending the hearings today. I am taking a list of questioners. I believe we are going to begin with Mr. Arsenault.

Wilfred Arsenault (PC): Thank you Mr. Chair. Ron that was a great presentation, very explicit and lots of information in there. Back in your recommendation number one you talked about development in coastal areas. Obviously it's a problem It's a major problem for Islanders and I guess off-Islanders who have cottages and in the past government has - in the past 25 years or so, government has up until recently has been very open to giving building permits and cottages have been permitted to go up very close to the shoreline. When you talk about development in coastal areas, are you referring to commercial tourism development, is it a general statement? Are you including personal cottages in there, residential cottages? What does that imply? If you could expand on that.

Ron MacMillan Q.C.: Well I think - Mr. Arsenault I was thinking about the whole scope of it. It could be cottage lot development that is along our coastline and increasingly so, there is commercial development as well. I suppose - there was one slide there which showed - was that in North Rustico where the fishing hut was there was off its base. So there is certainly areas where you could have whether it's in the fishing communities, in the wharfs where the buildings at Basin Head is an example as Mr. Mooney knows, the damage that occurred in the Basin Head area to the cannery as well as, of course, to the wharf itself.

So I think it's very all encompassing where we'd be talking about recreational development, residential. There is a lot of people who have built year-round homes near the shore and as well as commercial development. It could be in relation to the fishing industry or it could be just cottages or motels that are built close to the shore. I just can't think of one right off hand. It's an issue along the coast line and in some areas it's more of an issue than others. Some areas the erosion and the impact of storms is more dramatic than in other areas but certainly it impacts, I think, on all development.

Wayne Collins (PC) (Chair): May I ask Mr. MacMillan. What is the minimum required distance right now from new development to the shoreline or the high water mark, high tide mark? I understand it's -

Ron MacMillan Q.C.: I think it's 75 feet.

Wayne Collins (PC) (Chair): - Seventy-five feet.

Ron MacMillan Q.C.: I was going to say 65, 75 feet, okay.

Wayne Collins (PC) (Chair): Seventy-five feet. Has it been 75 feet for a long time?

Ron MacMillan Q.C.: It has been as I understand it for some time, yes. And as I say, that's one of those areas where I think that we have to be revisiting.

Wayne Collins (PC) (Chair): When you talk about sort of mitigation efforts and maybe even putting up some kind of breakwaters and that, we did have a representative here at this committee, I believe from Parks Canada who expressed that they had tried various schemes over the years to try to mitigate shoreline erosion in the national park, all to no avail ultimately. Would you recommend that we explore ways to try to mitigate that or recommend in that area or should we let nature have its way?

Ron MacMillan Q.C.: Well certainly I'm no expert in this area and your other presenters would be. I mean just from the general articles I've read, similar situations down in the United States, I understand it is very difficult to do anything on a long term basis that will prevent significant erosion. I mean when you start thinking of the power of these storms - you think what would you do, you'd put a great big concrete wall around the whole province and even that might not withstand the forces, to use probably a ridiculous example. I understand that it is very difficult to do something that will significantly reduce the coastal erosion over time, yes I understand that. That's not to say that we shouldn't keep looking for ways to minimize it to do things.

Again, I was reading an article, I think it was in *National Geographic*, not too long ago, it said down in the US they were using I can't remember, it might have been a different situation, whether it was in the New Orleans area or on the Gulf of Mexico or on the coast, where they were using

Christmas trees and they were bundling them up. I mean these were, of course, almost hundreds of thousands of trees that they were putting along the shore. I think there is varying degrees of success on that. We're right on the Gulf of St. Lawrence, especially on the north side. Whether any real success can be achieved I don't know. I think it's pretty minimal. I'd agree.

Wayne Collins (PC) (Chair): Further questions from committee members? Mr. Brown.

Richard Brown (L): Thank you. I might have forgot it or I came in late. What's your policy or the department's policy on public transit for communities? Do you support it? Because you're Community and Cultural Affairs.

Ron MacMillan Q.C.: That's right. Well I guess in terms of - I don't know if we - although we've discussed that with the communities, Mr. Brown, we probably more less, I think, let Transportation and Public Works take the lead on that. I mean I may be waffling a bit on you there, but I'm probably telling you the truth too.

Richard Brown (L): Is your department developing anything as to - seeing that you are Community and Cultural Affairs, for the one tonne challenge and for environmental to reduce CO_2 levels. Is your department going to take the lead with communities or Department of Environment or?

Ron MacMillan Q.C.: I think that would be more the Department of Environment that would be taking that. We certainly deal with - we're in terms of Community and Cultural Affairs and our relationship with municipalities, that would be more like we deal with them in terms of their official plans and their zoning bylaws and infrastructure. We have responsibility for our infrastructure. We also, where municipalities don't do it themselves, we provide for building development and inspections and things like that nature.

Richard Brown (L): Will your department be the lead on the gas tax?

Ron MacMillan Q.C.: Yes, we will. On the so called gas tax new deal arrangement, yes.

Richard Brown (L): And have you developed anything on that yet or has it been- ?

Ron MacMillan Q.C.: We've certainly had a lot of discussions with -

Richard Brown (L): But when will we see that money flowing?

Ron MacMillan Q.C.: Well as you know it is - or has been placed in the federal government budget for this coming fiscal year, 2005-2006. I believe that there is a ramp up to it. So I think that our allocation this year is around 4.5 million from that program. So we would expect that - we would hope that there would be an expenditure of at least some of those funds during this coming fiscal year for sure.

Richard Brown (L): And is it going to be allocated based on population or - like the Feds are - no we're a minimum, we get a minimum plus population. Are we going to - has it been the policy and how is it going to be distributed throughout the communities?

Ron MacMillan Q.C.: Yes as you know in terms of the allocation to PEI we got I think it was I think 7.5 per cent of the fund on a national allocation which would - and we did lobby strongly for that or for more, actually, as did the Federation of Municipalities, so that would give us more than our population.

As far as within Prince Edward Island, we haven't made any final decisions on that. Certainly under the existing program that I'm familiar with, the Canada-PEI infrastructure program, we did - certainly the population was a factor that was taken into consideration.

Richard Brown (L): Okay. Thank you.

Wayne Collins (PC)(Chair): Minister Gillan.

Honourable Chester Gillan: Thank you, Mr. Chair. Mr. MacMillan, back to the climate change again for a moment. My question centers on the nature of emergency preparedness. We have been fortunate that, for the most part, these storms of the last five or five and a half years have centered in the non-tourist season, and I know that one big blow we did have was in September.

I'm thinking more or less of campers crowding along the coast and this type of thing. Do we have an up-to-date evacuation, notification,

communication system that would be in place if, indeed, it did happen sometime in July or the early part of August, for instance?

Ron MacMillan Q.C.: Yes, we do have plans in place for that emergency measures plan, Minister. We are constantly reviewing and working on those to make them even better, but certainly we do have plans in place.

One of the areas that we are working towards, as most jurisdictions are, is a public alerting system and how can we alert the public more effectively and more immediately, and of course, during the tourism season, that would present a particular problem and challenge as people, I guess, probably tend not to watch the television as much in the middle of the summer or maybe even listen to the radio.

I'm not sure, but certainly a significant storm in the summertime would present somewhat of a different set of challenges, especially in terms of notification and also the last storm in December 27, we did put out notifications over the radio in terms of requesting people to stay away from the coastline and that may not be so difficult when there's sort of a raging blizzard outside and maybe nobody could get there anyway, but if it were the summertime, there would be a real challenge to make sure that people stayed away from the coast.

I mean, you think of places like Peggy's Cove and areas where there seems to be an allure and people always want to go and see how close they can get to the waves without falling off the rocks, so that would be a challenge. There's no question.

Honourable Chester Gillan (PC): Thank you.

Wayne Collins (PC)(Chair): If there are no further questions - yes, Mr. Brown? Go ahead.

Richard Brown (L): During an emergency like September 2003, when would you call out the military? At what point during an emergency would you say: We'd better get in a communications crew for the militia we have here? At what point would we get that out?

Ron MacMillan Q.C.: Well, we do assemble a group up at our emergency operations centre up here at the National Bank building, which we share with the federal government, and I might say that has worked out very well.

We were one of the first provinces in Canada to join together with the federal government for a joint centre, but we have - to my recollection, I stand, to be corrected. We did have one or two personnel from the Armed Forces present during that - all a part of that time, so I guess that's just all a question of degree and what the damages would be and the severity of it, but we are certainly in communication with Armed Forces or security personnel and we haven't done that as yet, at least in the five years I've been here, but that's not to say it won't happen. I guess it's just a matter of how serious it was.

Richard Brown (L): But what's the protocol? When would you decide that? I think we have a good militia and a good military, a good reserves group here because I thought that September 2003, anyway, they should have been called out but -

Ron MacMillan Q.C.: Well, no. You make a good point. I'd have to defer to others to get the exact protocol and I could send that to your committee if you wish, but we do try to get as many players involved when there is an emergency coming to make sure that communications people, Forces people, so that they're all at the centre, so together we could make a decision on whether the situation warranted calling in the military, but you're quite right there. They're a very valuable resource that we certainly wouldn't hesitate to use if we had to.

Richard Brown (L): Are there joint exercises with EMO and the military? Like the chairman said earlier, or the minister said earlier, let's say there was a storm in the middle of the summer and campers and stuff like that -

Ron MacMillan Q.C.: I should have mentioned that yes, we do have table top and other exercises going on a continuous basis, provincially and regionally, that involve our group and the military and various other personnel, federal and provincial.

Mock situations like, for example, if there were something happened to a cruise ship that was in or a terrorist threat involving a cruise ship, we've had those types of situations and I think it's Cindy MacDougall's been involved in those types of situations that are emergency measures office and needless to say, we can always do better, but on

the ones that we've had, we've done reasonably well.

Richard Brown (L): I have no problem with the way it was handled. I just thought during that storm, like Halifax had them out and a question was raised: Why didn't we call ours? Was it a matter of money? (Indistinct)

Ron MacMillan Q.C.: No, I don't think so. We've certainly contemplated or thought about all the options and continue to do so, but you do raise a good point.

Richard Brown (L): All right. Thank you.

Wayne Collins (PC)(Chair): Well, thank you very much, Mr. MacMillan, and thank you to all your staff for attending here today. We appreciate your input (Indistinct) relations. Thank you very much.

Ron MacMillan Q.C.: Thank you very much. Thanks for the opportunity.

Part II - Sandra Boswell

Wayne Collins (PC)(Chair): Our next presentation today is from a private citizen, Ms. Sandra Boswell, if she would come forward, please.

Sandra Boswell: Are you the acting chairman today?

Wayne Collins (PC)(Chair): No, I am the chairman.

Sandra Boswell: You are the chairman?

Wayne Collins (PC)(Chair): Yes.

Sandra Boswell: Oh, okay.

Wayne Collins (PC)(Chair): I don't act like it, but I am.

Sandra Boswell: Mr. MacDonald was in the seat the last time.

Wayne Collins (PC)(Chair): Oh, that was for the Agriculture and Environment Standing Committee. This is a Special Committee on Climate Change and I welcome your presence here today and we do have two other presentations to come today, so in light of that, if you don't mind, I would like to see if we can keep your presentation to within 15 minutes, if that's okay.

Sandra Boswell: Okay, we'll try to do that. I had a computer presentation, but maybe you can put it up if you want, but I'll just wing it here.

Wayne Collins (PC)(Chair): May I ask, Ms. Boswell, before you begin, you're introduced here as a private citizen. Are you representing any particular group today as well?

Sandra Boswell: Well, the Allergy and Environmental Illness Group. We feel we've been very affected early on by changes in the climate and it's only in recent years that governments are taking note of climate change, but many of us are affected by changes in weather, same as people with other types of -

Wayne Collins (PC)(Chair): So can we conclude your speaking on behalf of this group as well today?

Sandra Boswell: Yes, yes. For sure.

Wayne Collins (PC)(Chair): Great, thank you very much. Please continue.

Sandra Boswell: Okay, so we've been warned about climate change for decades, but most of the time, we've chosen not to heed the warning if it meant sacrificing our materialistic needs, our lifestyle or disrupting the marketplace. We simply sit back and let it happen.

Clearly decades of warnings by scientists have not been taken seriously by many people here on Prince Edward Island, Canada or around the world. We are told by scientists that there is evidence of the earth's climate, that it has been warming dramatically since 1985, according to Health Canada.

The average temperature on a global basis has increased by 0.5 Celsius and Canada's average temperature has risen by 1.1 Celsius in the same period of time. This is an extreme change in temperature and it's critical that we implement a plan for all Canadians.

We need to go beyond the Kyoto accord. It is not only industry and various levels of government that

must change, but individual behaviors must change and each of us must take our environmental responsibilities seriously.

This warming trend will have detrimental effects upon our environment, the place we know as home. The fact of the matter is climate change's effect have already begun. There is clear evidence of that with increased asthma, COPD, multiple chemical sensitivities, allergies, heart disease, various types of cancer and other respiratory diseases. Perhaps there is even a role for a host of depression and anxiety disorders as a result of all the chemicals we must face on a daily basis.

Earth is not a pretty picture for our children. The pollution we are leaving for them to cope with is nothing short of irresponsibility. Scientists tell us that there will be widespread coastal flooding, which is already occurring, and human health issues.

Prince Edward Island has begun to see this reaction to climate change. The countdown began decades ago, but governments and many of their citizens buried their heads in the sand and refused to listen to the cry of the environmentalists. Where are we now? Perhaps we are at a point of no return and every living citizen in the world is to blame. We're all aware that climate change is already having an impact in our northern regions. The melting of the polar ice caps is the direct result of climate change.

We are also seeing more severe weather occurrences such as the manifestation of tropical storms, heat waves, extreme cold and the arrival of tropical diseases like malaria in a temperate country like Canada and we've also had the West Nile virus in recent years as well.

I don't know if there's a need to explain the greenhouse gases, but carbon dioxide, CO_2 and methane, CH_4, are naturally occurring in our environment. Carbon dioxide is odourless. It is released into the atmosphere naturally by decaying organic matter, volcanoes, gas fires, forest fires and the air exhaled by people. Carbon dioxide is also released into the air by fossil fuels used in automobiles by the generation of electricity and heat.

Methane is also naturally occurring. It's colourless, odourless and flammable. Methane occurs from organic chemicals decaying in marshes, rice paddies, volcanic activity and the gas that's produced by the cow's digestive system. Oil mines, coal mines and landfill sites produce methane.

In 1997, Health Canada reported that methane had increased by 5.6 per cent between the years from 1984 to 1993. It is not always public knowledge that landfill sites create greenhouse gases, but according to Health Canada, they do. Landfill gas contains a mixture of methane - 40 to 50 per cent methane and 35 to 50 per cent carbon dioxide and other gases are created in these landfill sites due to the breakdown of organic waste paper, food and wood.

Health Canada claims that landfill sites may pose a health problem and be a safety hazard to residents living near landfill sites. Explosions or migrating gases can be found at the landfill site or in adjacent properties. Gas from landfill sites pose a problem of asphyxiation if it enters an enclosed space or structure that is not adequately ventilated, and the greenhouse gases have been growing steadily since 1800.

According to Health Canada, the average car generates 4.72 tonnes of carbon dioxide per year based on a total distance of 20,000 kilometres traveled per year at a consumption rate of 10 kilometres. We must cut down on fossil fuels if humans are to survive here on earth. If we do not, the earth will become a wasteland and it will not be able to provide and it will not provide us with the oxygen we require in order to sustain human life or any other species. Our homeland, Earth, will become a virtual uninhabitable place.

Nitrous oxide, hydro fluorocarbons, perfluorocarbons and sulfur hexafluoride are other greenhouse gases that are robbing us of oxygen. The hole in the ozone will only worsen if officials and individuals do not take responsibility. We have no time to wait for someone else to do the world. Citizens of the world must begin to buy products and live in a manner that will not be detrimental to our world and the air we breathe.

We can begin this process at home by making good decisions about products and the types of packaging we purchase. We can insure that our homes are built from recyclable products, not plastic. We can use products for cleaning that do not contain bleach, phosphates and other

chemicals that harm the environment.

We can also choose to find alternative sources of heating during the winter months. If homeowners can't afford to make these environmentally-friendly changes, then governments at all levels should provide incentives and grants to do so. We must all meet the one-tonne challenge and even exceed it for our children's sake.

Probably some people here think these words are an over-exaggeration, but according to the World Health Organization and the World Meteorological Organization and the United Nations, they tell us that climate change is having a negative impact on human health.

They claim that the level and manner in which we conduct our industrial and agricultural activities are now so great that the gaseous composition of the lower and middle atmosphere, the troposphere and the stratosphere has begun to change. The results of these activities are likely to effect the world's climate and many of the world's natural systems, ground-level ultraviolet radiation and all life on Earth.

We have no time to wait and let's begin to change our behavior in order to survive. Climatologists tell us that because of the accumulation of these greenhouse gases, CO_2 and other types of gases, our climate will change more rapidly than any other human society has ever known. They tell us that climate change has never been experienced at such a rate as we are living today, not since the advent - approximately 10,000 years ago - of agriculture and settled living has there been such drastic changes.

Climatologists tell us that the mean surface temperature of the earth has increased by 0.3 to 0.6 degrees Celsius and by the year 2100, according to advanced computer models, may increase to three degrees Celsius. They also predict that the sea level mean, on a global scale, may raise by 0.2 metres and 1.0 metres by the year 2100. It's expected to continue to rise for several centuries.

Even if the world's greenhouse gases became stabilized today, they probably would not change. The World Climatologists Organization has predicted sea levels will rise to two or three times greater than what the world had experienced in the last 100 years.

Man has made gases, especially halocarbons, and N20s that have reduced the stratosphere ozone levels, especially at higher latitudes. The result is a larger proportion of solar ultraviolet radiation which now reaches the earth's surface. The damage to the stratosphere ozone continues and the rate of overall ozone depletion has risen during the 1900s, according to the World Climatologists Organization.

According to the World Health and the United Nations, preventative measures in poor nations will be more feasible and acceptable if they also met pre-existing needs. For example, a development in large scale introduction of low-cost solar heat cooking devices in developing countries would help to reduce greenhouse emissions and reducing deforestation rates and indoor air pollution would help.

Between the years 2025 and 2100, about one-quarter of the world's CO_2 increased emissions is predicted to be the result of population growth. The World Health Organization and the United Nations believe that the international transfer of resources to the developing world will curb the population growth and may be beneficial in counteracting deforestation. Today, there is 1 per cent donor aid at the international level spent on family planning. Studies tell us that the modest increase of two to 3 per cent would be adequate to insure that family planning is available.

Some industrial oil companies have now exceeded the capacity of their own territory to feed and support their population and are relying on extensive imports purchased on the international market. Industrialized nations now must show a commitment to reducing their consumption patterns, particularly by a shift to alternative energy sources.

The impact of diesel on our health: Diesel exhausts pollution. It is a huge contributor, as we all know, to air pollution, smog-forming oxides and nitrogen, fine particle matter and in the United States in 1996, diesel exhaust pollution accounted for over one-quarter of the 23,393,000 tonnes per year of nocks pollution produced nationally.

In a paper written by NRDC, that research tells us that in California, an estimated 26 per cent of particles - that's particulate matter - from fuel

consumption sources in the indoor air comes from diesel engines. Exhaust from heavy-duty diesel engines contains between 100 to 200 times more small particles than the gasoline engine exhaust. With the increase of truck traffic on our road, can you imagine the level of diesel that's currently in the air that we are breathing?

The NRDC also focused on the fact that particulate matter - PM - which is more like a tiny, fine - which is more tiny and fine - actually is more dangerous to our health than if the particulate matter were emitted at a larger rate.

You probably all understand that and maybe some don't, but recently Health Canada had changed the particulate matter to 2.5. By making that particulate smaller, what it did is it insured that our children, who breathe much more deeply than adults do, will breathe this very fine, tiny particulate matter directly into the depths of their lungs.

Now if it's a bigger piece of particulate matter, they might sneeze, cough or be able to get rid of it in a couple of hours or a couple of days, but with this tiny, fine particulate matter, it settles in the very depths of their lungs and that's where you're finding children that are already chemically sensitive, that are already extremely allergic, that already are showing signs of COPD, which by the year 2024, is expected to be a worldwide epidemic and that doesn't include smokers.

The smaller particles from the diesel exhaust are very dangerous because they are coated with a mixture of chemicals such as polycyclic aeromatic hydrocarbons, nitroaeromatic benzene dioxins and other toxins, and these particles act like a special delivery system which places these toxic chemicals deep within the body.

Some asthma medication used for delivering a beneficial drug through a puffer, say, diesel exhaust is like a provision of a drug delivery system which delivers hazardous toxins directly into the lungs. The particulates are retained in the body along with other toxic chemical hitchhikers which would be otherwise eliminated quickly, thus the particle lengthens our exposure to toxins and diesel exhaust.

There are alternatives to diesel fuel. The UPS, which is a North American company, has the largest private fleet of CNG vehicles in the United States. The company has been researching hybrid electrical vehicles since 1998. Hybrid electrical vehicles have the ability to potentially and significantly reduce emissions and fuel consumption.

Chrysler Epic minivans have been added to the UPS fleet in November 2003 and UPS deployed the package delivery industry using alternative fuels for their tractors. Eleven liquefied natural gas tractors now operate on our west coast, hauling 28-foot long trailers on a 545 trip between Ontario and Los Angeles. They also will be used to pick up large trailers filled by volume customers.

LNG is described as a very dense fuel which can provide huge amounts of energy for the amount of space it takes up. According to the UPS, LNG is an excellent potential fuel source for large trucks, like tractor trailers, which need to travel long distances before stopping for additional fuel.

Propane-powered engines: UPS has also converted 750 of their vehicles - roughly half of their fleet - to propane-power engines. In addition, 95 per cent of its fleet in Mexico operates on propane power. Propane's low pollution characteristics and positive performance have made it a viable choice for inclusion in UPS alternative fuel fleets.

Fuel-celled vehicles: UPS is in a partnership with the United States Environmental Protection Agency and Chrysler to operate package delivery vehicles powered by hydrogen fuel cells. That's probably not new to most of us.

Fuel cells convert chemical energy. For instance, hydrogen's reaction with oxygen into electricity without combustion. The reactions of hydrogen and oxygen produce water vapor and heat as its only by-products or emissions. The lack of any exhaust emissions makes fuel cell technology the ultimate alternative fuel.

It appears to make perfect sense that governments around the world would encourage or require automobile manufacturers to build vehicles using fuel cell technology. If they can make these types of cars affordable to buyers and then I'm sure they would purchase them.

The huge payoff would be a significant reduction in air pollution and a reduction noted in the various

types of health conditions like asthma, COPD, multiple chemical sensitivities, heart attacks, cancers and other health conditions. This would save our government so much money in health care. The pharmaceutical companies might not be happy, but we average citizens would be very happy. It would be irresponsible of our government, and governments of the world, to put the economy ahead of our children's future. It is immoral of us to use so much and waste so much when we know our children will have to deal with the environmental messes we leave behind.

This is not a legacy I want to leave my children and grandchildren or anyone else that will have to live on the polluted earth, a place we destroyed through our inability to see the reality that lay before us. We turned a blind eye and allowed companies and businesses to destroy our world.

Many of us knew we were creating environmental nightmares by allowing pesticide companies to brainwash producers and saturate our land, air and water beyond repair. Then there is the auto industry that has had the ability and technology to build vehicles that pollute less, but do not aggressively market them because of their greed and the greed of the consumer. Apparently driving cars that pollute is worth more than the clean air to the children that our children must breathe.

We have welcomed and promoted plastic companies that have also polluted our air, water and the human body. These types of polluters are responsible for many types of cancers that appear to be spreading like the plague. If we allow this irresponsible behavior to prevail without any alternatives, then we can only blame ourselves. We are a despicable generation and we will be remembered for being the most greedy.

That was long, sorry, but I also had some alternatives which I've given you, Mr. Chairman, a copy of. One that concerns me is having a bus service in the city of Charlottetown and Summerside and also I think there should be a provincial bus service. There's no need of one person driving a car from Montague to Charlottetown to come into work and that would certainly cut down significantly if those buses are environmentally friendly and not running on diesel.

We could maybe find a way through grants through the federal government - I understand there's some monies available there - where maybe we could help taxi drivers either convert their cars or get environmentally friendly cars that would stop polluting.

Then there would have to be incentives for gas station owners to be rigged up so that they could recharge and keep the types of fuels away on hand that these new cars would have. I think every government official and all of the school buses on Prince Edward Island should all be environmentally friendly. It's no good in saying: Wait now. We'll do it another year.

I realize we don't have money now as a government, but I think the people of Prince Edward Island are so concerned about climate change and their child's health that I think fund-raising could be done to find at least some vehicles, and I, for one, would be quite willing to work on it free of charge.

Most of my work is free, and we want to try to get the MIT out of the gasoline that we are using, that the North American free trade told us we couldn't have anymore. Sheila Copps took it out and they made us put it back in, but no country should be able to dictate that to us and I'd like to see a paper on that because it seriously damages the central nervous system of every human being in Canada or wherever it might be.

We need to invest in renewable energies and housing, try to lean towards solar or other types. We talked about the government cars and creating efficiency standards and programs and audits, creating greenhouse initiatives, encourage consumers to use their clothes dryers less, asking manufacturers to produce more environmentally friendly appliances such as clothes dryers, washing machines, freezers, refrigerators, televisions and air conditioners.

Ask manufacturers to use less plastic and something else that we can actually recycle because you can't recycle plastic. That would cut down on our pollution in our air and in our streams. Create an initiative program for people of all ages to walk, bike or other means of transportation other than a vehicle to get around, and try to do a little more decentralizing. It's silly to be worrying about climate change, but having all the box stores where people must drive into the city to buy everything, so maybe some kind of decentralization would be

good there. Decentralizing schools, in my opinion - not a favourite with all people, but you sure would cut down a lot on pollution and plus, the schools are not working as greatly as we'd like. I talked about the school buses and alternative fuels.

A real effort to ask manufacturers to cut down on packaging because a lot of our packaging must be thrown into waste and you can't recycle that. You can't compost it, so I know that's the job of the consumers, but I think if they hear a government person encouraging them to do that, that they will actually work hard to work with you.

We need to develop farm plans in regards to gasoline and diesel use, which they're very dependent on now. We need to look at agricultural practices. There is a need to develop pesticide alternative programs that do not contribute to the greenhouse effect because they do. They all gather in the atmosphere and they're like a cocktail.

You could have 20 people spraying in Summerside, the cloud blows down to Charlottetown, it rains and then we have it all and that's the toxicology fellow, not me. Pesticide have a negative effect on our ground water and the nitrates from the fertilizers also affect our human health and cause blue baby syndrome. Pesticides have the ability to infiltrate our soil and damage our water, as we all know, and they're toxic to our health.

We need to talk to bio-tech companies, too, to make sure that when they're doing their genetics on their plants that they're not changing the genetics and the characteristics of our plants, so that our plants and trees can't absorb the polluting gases from our environment because we've had no experimentation to actually show whether that could happen or not, so that would be another area. We need the dirty air that we're breathing is causing sickness and what we must do is adapt the *Clean Air Act*. I don't know if you have the act or if you've got information on that.

Wayne Collins (PC)(Chair): Ms. Boswell, if I may interrupt just for a moment? We do, as I mentioned, have two other presentations today, so I'm wondering if you could wrap up your presentation shortly.

Sandra Boswell: Okay. Well, I guess it's pretty much wrapped up except that you have - there's a list of some other concerns there in regards to fertilizer and air pollution, but it's nothing that you can't read, but I think we have to lean more towards things that we can recycle and -

Wayne Collins (PC)(Chair): Do you have a written copy of your presentation available?

Sandra Boswell: I gave you a copy.

Wayne Collins (PC)(Chair): All right.

Sandra Boswell: So that you have a copy of that, and I've spent quite a while researching this. It's part of it. If there's anything that you would need -

Wayne Collins (PC)(Chair): Are you prepared to take any questions now from committee members?

Sandra Boswell: Well, I don't know how helpful I'll be. I'm better at preaching sometimes.

Wayne Collins (PC)(Chair): Well, in case there are questions here, if anyone has any questions.

Sandra Boswell: But go ahead.

Wayne Collins (PC)(Chair): If not, we'll certainly - Mr. Brown?

Richard Brown (L): Mr. Chairman, thank you very much. Thank you very much for your presentation. I had to go in and out for a couple of minutes there. I'm sorry about interrupting you.

Just one quick question: You, as an Island taxpayer and a resident of PEI, would you mind if the policy of this committee was to make Enersafe appliances - you can buy Enersafe appliances - sales tax-exempt? You, as a taxpayer, would you be against that?

Sandra Boswell: Well, the government hasn't got a lot of money right now. They might need all those taxes, but I do think there has to be an incentive and the tax may be the way to go to get the people to buy the more - the alternative to polluting us.

The same thing with cars, so I certainly think that not only do government officials have to hear us, the people have to hear us, and they're not hearing the Kyoto Accord like they need to hear it. I think you need someone that's local, that the people will

identify with and believe and actually do something about it.

Richard Brown (L): Thank you.

Wayne Collins (PC)(Chair): Just as, I guess, Mr. Gillan, go ahead.

Honourable Chester Gillan: Just a quick question: I'm very familiar with Sandra's work over the past number of years and it is very exhaustive and I appreciate what you have done here today as well, Sandra.

Sandra Boswell: Thank you.

Honourable Chester Gillan: I think we have a better awareness, would you agree, of environmental illness than, for instance, 10 or 15 years ago?

Sandra Boswell: Oh, for sure. We have a better awareness and of course, we have a physician now that these patients can travel to and see, which is very helpful, but people call it multiple chemical sensitivities and, you know, my term for it has always been chemical poisoning because I was able to track mine.

You know, I'm fortunate that I can be here. I don't come here and not have repercussions when I leave, but because I think it's very important, that's a reason I put the work into it and do that and I think we have a lot of knowledge about it. My big concern is I'm seeing very, very small children - I hear from people all over Canada - very small children just like me, and that breaks your heart. Thank you for that question.

Wayne Collins (PC)(Chair): Well, Ms. Boswell, if there are no further questions, I want to thank you very much for your presentation to our committee today.

Sandra Boswell: You're welcome.

Wayne Collins (PC)(Chair): It will help in our deliberations.

Sandra Boswell: Thank you for hearing me. I hope I didn't talk too fast.

Wayne Collins (PC)(Chair): I would like to point out, though, Mr. Brown. It's interesting. In this one-tonne challenge booklet right here, you talk about tax incentives for purchasing things, but it says here: By replacing five of the most-used standard bulbs in your home with what are called Energy Star qualified compact florescent light bulbs, you can reduce your greenhouse gases and save about $30 each year and they last for more than a year.

Sandra Boswell: Yes.

Wayne Collins (PC)(Chair): And the electricity for the so-called qualified refrigerators use half of the electricity than a unit built 10 years ago uses. So, I mean, these things, while initially somewhat more expensive, do have a quick payoff.

Sandra Boswell: Oh, they do. They have. I wash most of my clothes in the sink, except for the things that are too big and it does two things. It helps strengthen my muscles and it saves me from running tonnes of water through the dishwasher.

Wayne Collins (PC)(Chair): That's one of the recommendations in here as well (Indistinct) . It's a great little booklet.

Sandra Boswell: Yes, and all I have to do is call 1-800-OCANADA and anybody can get that. I actually can get a few and give them away from time to time.

Wayne Collins (PC)(Chair): Thank you again, Ms. Boswell.

Sandra Boswell: Yeah, have a great day.

Wayne Collins (PC)(Chair): It's a pleasure seeing you here.

Sandra Boswell: Okay.

Part III - Soil and Crop Improvement Association

Wayne Collins (PC) (Chair): Our next presenters today are representatives of the Soil and Crop Improvement Association, Mr. Tyler Wright and Mr. Alan Rennie. Welcome you gentlemen to our hearings today. We're going to take about a five minute stretch here while the setup is being done for the overhead display.

(Short break)

Wayne Collins (PC)Chair: Are we all set gentlemen? Is that all ready to role? Okay, just a second, alright. Okay, Mr. Rennie and Mr. Wright, the floor is yours gentlemen. You have our rapt attention, except for Mr. Brown and Mr. Mooney. (Laughter) Now you have our rapt attention.

Allan Rennie: Honourable members, MLA's, good afternoon ladies and gentlemen. Thank you very much for your time this afternoon. We're going to identify some issues regarding agriculture and climate change and what agriculture can do to assist. We will talk about what our organization is doing in that regard. My name is Allan Rennie. I'm president of the PEI Soil and Crop Improvement Association. I'm a beef, potato and strawberry producer from Alma, PEI and with me is Tyler Wright, volunteer manager with the PEI Soil and Crop. Tyler and I will be sharing this presentation with you this afternoon.

PEI Soil and Crop Improvement Association is a farm organization established in 1969. Our organization represents all types of farmers from across the province. Our mission statement reads: PEI Soil and Crop is committed to the conservation and wise use of the agriculture land base on PEI.

In the early days, we were focused solely on crop and production issues. In the last 15 years we have been heavily involved in development and implementing benefit management practices. PEI Soil and Crop has been involved in delivering soil conservation and waste management programs, providing technical assistance and the fencing of livestock from water courses, promoting agri-conservation clubs, assisting in nutrient management planning and environmental farm planning. We award two Soil Conservationists of the Year Award to deserving livestock and cash crop producers each year and our annual conference provides and opportunity for farmers to learn about new sustainable agriculture practices.

Farmers are known to be weather watchers. Everything we do is depending on the right range of moisture, sunshine and heat. We are connected to our environment in many ways. Across Canada, including PEI, we all heard news stories about crop failures, insect outbreaks, environmental damage and so on, all because of weather. With no question, agriculture will be affected by climate change. It is hard to believe, but the science says that in 50 short years our climate will be different and farmers will need to adapt. This afternoon we will speak on the challenges and also opportunities this may create.

Agriculture also can play a very important role in helping to mitigate greenhouse gases. This includes the gases that we create ourselves on the farm, but also the gases created by other sectors such as industry and transportation. The science behind greenhouse gas production and whether a farm is a net source of or a net sink is very complicated to calculate. Even the scientists cannot answer all of the questions yet. As farmers, we are slowly learning about all the potential sources and how we can reduce or remove greenhouse gases. Fortunately, most beneficial management practices will either reduce or remove greenhouse gases, improve the environment and perhaps even return some financial advantages to us.

Tyler Wright: Good afternoon. In total, agriculture only contributes 10 per cent of the total Canadian emissions of greenhouse gases. The three major gases we talk about includes, carbon dioxide, methane and nitrous oxide. If you compare nitrous oxide to carbon dioxide over a period of 100 years, nitrous oxide is 310 times more potent. Methane would be 21 times. From Canadian agriculture, the major sources of these gases are manure and terra fermentation, crops and fertilizers as shown on this graph. And terra fermentation is part of a digestive process found in ruminants such as cattle. For PEI, this graph probably would look a little bit different with more emphasis likely on cropping and fertilizer and less on manure and ruminants.

Allan Rennie: If all the scientific projections for the 40 years are correct, then farmers will need to adapt. Our current practices could become obsolete or ineffective and we may be able to do things that once we thought was impossible in this region. We thought it would be important to highlight a few climate changes to the Special Committee on Climate Change that will be important to us.

How will agriculture adapt to warmer winters with more rain? The scientific community is predicting that by 2040 daily rainfall amounts will increase by 28 per cent in the Maritimes as compared to the

average from 1961 to 1990. There will also be less snow. By 2040, the annual snowfall amounts will decrease by 33 per cent and the days of risk of no snow cover protection will increase by 97 per cent . No snow cover is a risk for winter kill of crops and increased capacity for wind erosion.

More heat units in the summer - by 2040, the available heat units will increase by 27 per cent in the Maritimes as compared with the average from 1961 to 1990. Less intense cold - by 2040, the annual minimum temperatures will be 3.3 degrees Celsius warmer in the Maritimes as compared to the average from 1961 to 1990.

Greater water deficits and more intense rain storms in the summer - by 2040, the number of years that would have had rainfall deficits will increase by 25 per cent and there will be higher frequencies of extreme climate events - drought, intense rainfall and hail. This will be just a few examples of how our climate will be changing. Obviously, this will be creating some serious challenges but perhaps some opportunities for farmers. So how will agriculture depth the challenges and opportunities brought on by these climatic changes.

Tyler Wright: Agriculture has never been short of its challenges. Climate change appears to be the next in line with extreme weather events and production problems. With less snow cover and more rain in the winter and with more extreme rainfall events in the summer, we will run the risk of significantly more wind and water soil erosion. Adopting sound land management practices will be key to these challenges. These practices will include, among others, crop rotation soil conservation, nutrient management and integrated pest management. Improving the soil water holding capacity in good irrigation management will be key strategies to address the potential for drought.

The picture at the bottom right on this slide demonstrates the soil erosion that can occur in a severe thunderstorm. Under the climate change scenario this will be more common. In fact, it seems that these heavy rainfall events are more common now then they use to be. Many farmers are making a real good effort to mitigate these risks through soil conservation practices. That is currently going on. Increases in insects, weeds and disease problems will continue to be an escalating problem with climate change. Warmer winters may increase the range and severity of pests such as the Colorado potato beetle. We likely will be introduced to new pests we've never had to deal with before.

Climate change could also decrease the efficiency of pesticides resulting in more frequent applications. Plants will be under increasing moisture stress and drought. All of us in the farming community remembers how serious the drought in 2001 was, resulting in potato yields being reduced by 35 to 45 per cent.

With these climate change issues affecting us on farm, we also become concerned about the potential off-farm effects such as sedimentation, (Indistinct) and fish kills. We need to address these challenges to prevent these damaging off-farm effects. With milder temperatures in the fall the plants and trees that we now know will not harden off in the same way jeopardizing their survival. With less snow cover, winters with cold snaps will likely see increased winter kill. Farmers will need to establish new varieties to effectively deal with these changes in the environment.

But you know, maybe it's not all bad news - this thing called climate change. With adaptation comes opportunities. For example, increased carbon dioxide in the atmosphere tends to improve plant water use efficiency and rates of photosynthesis thereby giving the potential to increase crop production, assuming the other limiting factors does not come into play - like drought.

We do have yield predictions on some crops for the Maritimes. For example, grain corn yields could increase by 67 per cent . Soybean yields could increase by 40 per cent . Other crops like barley will remain unchanged. In the Atlantic region, the fruit and berry sector could also benefit because of milder winters and longer growing seasons. Farmers may be able to grow more profitable crops for which we did not have enough heat units for the proper climate in the past. Agriculture and Agri-Food Canada is predicting that the normal planting dates for potatoes on PEI will be almost three weeks earlier than it is now.

So back to April 29 as opposed May 19th, extending the growing season. Maybe farmers will be able to harvest the potatoes earlier in the fall and able to plant a more effective winter cover crops to protect the soil from wind and water erosion over the winter months. In fact, the milder fall may allow that

crop to establish better providing a good cover for the winter and holding soil nutrients from leaving.

The predicted climate change effects will have an important impact on crop production in our province. There would be some major challenges but there could also be benefits with some opportunities. The more we research and discuss climate change the more prepared we will be for the future. We also have to remember that this change is gradual and will not happen over night and that no one really has a crystal ball on this issue.

Allan Rennie: The second component of our presentation this afternoon will discuss how agriculture is playing a vital role in mitigating greenhouse gases. As we will discuss some efforts our association is making in PEI to promote practices that reduce and remove greenhouse gases, it is important to understand the differences between the terms reduce and remove greenhouse gases. They are not the same. By reducing greenhouse gases, we are reducing gases produced by our own sector in our daily activities such as burning fossil fuels. By removing greenhouse gases, farmers are helping other sectors with their emissions by removing carbon dioxide from the atmosphere. This is known as carbon sequestration.

How can a farmer mitigate greenhouse gases? Simply put, the more efficient a farmer is in managing his livestock and crop land, the more he or she will reduce or remove greenhouse gases. These management skills we refer to in agriculture as beneficial management practices or BMP's. In addition to helping climate change, BMP's improve the quality of soil, water, air and bio-diversity. BMP's generally improve the environment and perhaps increase the profitability of the farms.

Tyler Wright: Farmers can remove carbon dioxide from the atmosphere. Agriculture is in a unique position because of its ability to capture atmosphere carbon in growing crops and then store a portion of that carbon in soil organic matter. Agriculture soils can be a source or a sink for carbon dioxide depending on the management and tillage of that soil. For example, excessive tillage will release carbon dioxide. A carbon trading system is being developed and tested in Canada. In this a large final emitter such as a power generating company burning fossil fuels could trade or buy carbon credits from a farmer who is increasing soil, carbon or organic matter in his or his soil through reduced tillage such as no-till or planting trees. Emission credits could also be traded for practices that reduce methane and nitrous oxide. This allows companies to achieve emission reduction targets as a relatively low cost and provides the farmers with a new source of income to reward his good farming practices.

Forestry practices is our terrific method to sequester carbon as well. Trees, like growing crops, remove carbon dioxide from the air storing it as carbon in trunks, branches, leaves and roots. If a tree is ever harvested for lumber then that carbon will continue to be stored in the lumber product until it decays or rots, similar to a tree that falls in the forest. But the thing is, the tree can be replanted and recapture that carbon.

In Canada, the western provinces will likely be the main beneficiary of carbon trading because of the vast agricultural land base, the large number of producers using no-till seeding and the large number of livestock farms. For Prince Edward Island farmers there would likely be very little opportunity for monetary rewards, unfortunately, because of our cropping systems, our intensities of our land base, our relatively high land value and relatively small livestock numbers.

Farmers can reduce the carbon dioxide we produce. Like other sectors we can become more energy efficient, ultimately reducing fossil fuel usage. Reducing tillage using more legumes, using fertilizers and manures more efficiently, increasing energy use efficiency and use of ethanol, biodiesel and bio-gas are all ways to reduce carbon dioxide emissions. Legumes such as clovers alfalfa fixes its own nitrogen needed to grow from the air. Having more legumes in the rotation reduces the overall need for artificial nitrogen. By improving the ways chemical fertilizer is used, will ultimately reduce the amount of fertilizer manufactured. The making and transporting of fertilizer components such as nitrogen is very heavily dependent on energy.

Farmers can reduce the methane we produce. Most methane from Canada's farms comes from the livestock industry, either directly from the animals or from the manure they produce. All animals produce methane when they digest feed. For ruminants it is much higher because of the

fermentation process that occurs in the rumen. Methane actually represents an incomplete use of feed energy and that's a loss to the farmer. For years researchers have been working on improving feed and production efficiencies through better livestock breeding and improved feed rations. So any practice that increases the productivity per animal will reduce methane missions. Improved manure management and handling will also reduce methane. Methane is also a very effective bio-fuel. It is the main constituent of natural gas. There is a growing interest in having on-farm bio-digesters for methane. With the small scale of livestock farms on PEI, this approach may not be practical or economical at this point.

Nitrous oxide production is favored by low oxygen levels that most often occurs in water saturated soils. There are methods and practices that farmers can use to reduce nitrous oxide production. It all comes down to the efficient use of nitrogen. Nutrient management planning allows farmers to account for all the different sources of nutrients including legumes, manure and soil and it balances that with what the crop will require to grow to determine what artificial fertilizers would be required. It would encourage farmers to test soil and manure, calibrate equipment and understand environmental issues. Improving the soil aeration, drainage of a farm and the management of irrigation will reduce nitrous oxide emissions.

Allan Rennie: PEI Soil and Crop has been involved in a national greenhouse gas mitigation program for three years. The program is funded by agriculture and Agri-Food Canada. Our connection with the programs through the Soil Conservation of Canada for the soil and nutrient components. PEI and Soil and Crop is a member and director of the council's board. The council has established ten taking-charge teams across Canada. The other industry groups delivering a livestock component of the program are Canadian Cattlemen's Association, Canadian Pork Council and the Dairy Farmers of Canada. The program promotes the adoption of beneficial management practices through communication and on farm demonstration activities which have the potential to reduce or remove greenhouse gas emissions while maintaining or improving the economical viability of the farm. PEI Soil and Crop has established 30 demonstration sites across the province in the past three years.

Tyler Wright: In regards to our nutrient management plan we have established 12 demonstration sites where we are comparing a conventional fertilizer plan to a nutrient management plan. Each year in the potato, grain, hay rotation, the farmers fields are split into repeated treatments for data collection. This map on the slide illustrates one such example. We are also assisting George Webster, a potato producer from Middleton and Bedeque Bay Environmental Management Association at the Maple Plains Agro-Environmental demo site in the development of a plan for that farm. This is some preliminary results from 2004 on the nutrient management demos. Basically what we are finding that between the conventional and the nutrient plan, there is no significant difference in the yield of the potato crop and the farmers are saving anywhere from $40 to $110 per acre.

Andy Mooney (PC): Just one question. So how many rotations would that be?

Tyler Wright: We're still in the first rotation. So we'll be going back to the same potato field in three years. So we're hoping it will be a long term study. We have also been development nutrient management plans and livestock rotations and demonstrating injection of liquid manure compared to other methods. The bottom picture shows a sampling unit that we have used to capture and measure grab samples of nitrous oxide emissions.

We have four demonstrations sites where we are comparing different tillage treatments in potato productions including fall plowing, spring plowing and reduced tillage or residue management. There are many known and proven benefits of residue management in potato production. Residue management began here about 10 or 12 years ago. We are performing these on-farm research trials to see if potato tuber quality might vary between these tillage practices.

We're also exploring opportunities with agro-forestry. Agro-forestry in this region is completely new. We have to start research to see what will work here and what is practical. The first site we've established is in Orwell Cove at MacPhail Homestead. We have established choke cherry, service berry and elder berry to see that potential is in developing an organic industry based on fruit production from native shrubs. The second site is in Augustine Cove where we have established

some non-native trees that have potential for timber production. So we planted some things like red oak, black walnut, butter nut and douglas fir.

Allan Rennie: As farm mangers we need easy to obtain and accurate information to improve our decision making capacity. Planning for soil and water conservation projects requires information such as property boundaries, soil information, land use, locations of streams and wetlands and topography. Farmers have crop rotation legislation and buffer zone legislation. Both are dependent on accurate topography or elevation information to know when the Act applies. The current topography maps are based on contours at two meter intervals. For the purpose of applying both legislations more accurate topography information would be helpful to the farm manager. Otherwise, if the farmer is uncertain about the accuracy of the current topography maps for all given slopes of properties, they would need to hire a surveyor to determine a more accurate representation of slope. This would be expensive and time consuming.

Tyler Wright: Lidar Technology uses pulses of laser lights striking the surfaces of the earth and measuring time of pulse return. Mounted to the bottom of an airplane equipped with GPS, changes in topography can be accurately mapped at less then at 0.5 meter contour interval. Lidar, an acronym for light detection and ranging is accurate within ten centimeters or so. Lidar Technology has already been used to map the floor prone areas of the Northumberland Strait, coast of New Brunswick and PEI. Because of storm surges and climate change, the Halifax Regional Municipality is also looking at doing the same thing. I guess we wanted to make the point this afternoon, if Lidar Technology is being considered again for PEI, we would recommend that the technology be used to map the entire province. It would be a very valuable resource for planning.

Allan Rennie: We'd like to acknowledge the following people, organizations and publications in preparing and presenting this, this afternoon, our presentation. We don't have it on our slide so . . .

Richard Brown (L): (Indistinct)

Allan Rennie: That's a good thought. There's also - we've got - if you would like to understand more about these issues, we recommend the *Health of our Air* publications from Agri and Agri-Food Canada as an excellent resource.

Wayne Collins (PC) (Chair): Gentlemen I want to thank you. Is that the presentation generally?

Allan Rennie: It is, yeah.

Wayne Collins (PC) (Chair): I'm going to be taking a list of questioners here but I just got a couple of my own to start if that's okay. Nutrient management plans, you mentioned you have a demonstration underway right now. I take it nutrient management plans are optional at the moment are they, on PEI livestock farms?

Allan Rennie: That's correct yes.

Wayne Collins (PC) (Chair): Do you have any idea how many farms voluntarily get involved in nutrient management planning?

Allan Rennie: It would be surprising how many actually are. But the thing is I would - every farmer does a nutrient management plan and everybody is at different levels with it - some better than others. But generally speaking, a lot of farmers have done a good job. It's not - I would call it unofficial plan. If we sat down with them and say okay, let's put this on paper and do the balances and look at the whole thing, they're not that far off.

Wayne Collins (PC) (Chair): But there is nothing equivalent to I guess what you would call the Environmental Farm Management Plan, right? It's totally different.

Allan Rennie: No, we have the agri conservation clubs, a project that the soil and crops is promoting. Those members are probably leaders in nutrient planning, kind of official. They're working with the Department of Agriculture to develop plans.

Wayne Collins (PC) (Chair): Mr. Arsenault.

Wilfred Arsenault (PC): One quick question gentlemen. During your presentation you talked about heat units and you talked about an increase of 27 per cent by the year 2040. What does that represent in the form of an increase in average temperature as in Celsius degrees.

Allan Rennie: We don't know. They're predicting 3.3 degree Celsius, I believe, is the minimum

temperature increase. So what the increase in heat units translate in to increases in temperature - you's have to ask a climatologist that question. I don't know.

Wilfred Arsenault (PC): That's not Boomer is it?

Tyler Wright: Pardon me?

Wilfred Arsenault (PC): Not Boomer?

Tyler Wright: Not Boomer. He'd like to think so, maybe but . . .

Wilfred Arsenault (PC): Okay, thank you.

Tyler Wright: You're welcome.

Wayne Collins (PC) (Chair): Mr. Mooney and then Ms. Bertram.

Andy Mooney (PC): When you're talking about changing the feed rations and things for ruminants to decrease their emissions of methane, basically is that just speeding up how quick they get to market?

Tyler Wright: Basically, yeah. The quicker you can put the weight on the cattle or the quicker you can - or the more liters of milk you can produce out of the same cow. So what you're doing, you might have the same emissions of methane.

Andy Mooney (PC): Just over a shorter period of time.

Tyler Wright: But per kilogram of meat or of milk, it's lower.

Andy Mooney (PC): The other point. I'd be very interested to see how your next couple of rotations of the nutrient management goes as far as lowering the fertilizer inputs. I know there has been a couple of farms up our way a few years ago, they took a heck of a notion they were going to cut substantially the amount of fertilizers. The first year they noticed virtually no change in their yield, but where they got nailed, was the next rotation. Because the first year they cut back, the plants just took everything that was available in the soil and then the next rotation they put on the lesser amount again. There just wasn't enough there for them.

Allan Rennie: That's not exactly balancing it off.

Andy Mooney (PC): No, that's what I mean.

Allan Rennie: You've got to add what you required there.

Tyler Wright: We are looking at each crop in the entire rotation. We just don't look at the potato year, we look at the cereal year and the forage year. In the livestock rotations we do the same. We're working with the Department of Agriculture on this and their approach is very slow, very cautious, one step at a time. We're not jumping - we're not going to take a big leap of faith and make mistakes. We want to do it right.

Andy Mooney (PC): And it's incredible how much work even the crop scouts are doing now with fall analysis, even on our own farm home.

Allan Rennie: Everybody is doing nutrient management really. We all may be able to tweak it a little bit and improve but generally we're all doing nutrient management.

Andy Mooney (PC): Okay, thank you.

Wayne Collins (PC)(Chair): Ms. Bertram?

Carolyn Bertram (L): I'd like to thank you. You did a great presentation. I think it was interesting when you brought up the potato crops with the 20/40 perspective in terms of the three week earlier.

Alan Rennie: Oh, yes.

Carolyn Bertram (L): In terms of putting in a crop. Our backyard, the fields that are behind us in our household, we have potato fields and now all the topsoil is all in our yard and it's just -you know the drills. It's just - so that will be beneficial to plant.

Alan Rennie: A winter cover.

Carolyn Bertram (L): A winter crop with winter cover.

Alan Rennie: Yes, exactly. Yeah.

Tyler Wright: That's a major problem with later varieties is getting that established to do any good.

Carolyn Bertram (L): Is there any like for a farm, for potato farmers - there's no legislation in place - or I'm not aware of it - in terms of how they have to spread the hay or straw on potato fields. That isn't legislated. That's just some friendly thing.

Tyler Wright: Yes, it's a voluntary action by the farmers. The only exception would be if a farmer, through the ACRA Crop Rotation Act, they may have a crop management plan in place and that may be one of the actions they've agreed to do to come in compliance with the ACRA legislation, but that would be the only exception.

So all the - 99 per cent of the winter cereals you see planted or the straw or hay you see spread on the field is totally voluntary by the farmer.

Carolyn Bertram (L): What is the benefit? Even if we take away the potato crop in terms of, let's say it was - they're out plowing in the fall. Wouldn't it be better to plow in the spring so that you have that foundation? I know there's benefits probably, but -

Alan Rennie: You saw it. The reason for plowing in the fall is time is won. Sod breaks down a little bit better. It's much easier to dig the crop for next season.

Carolyn Bertram (L): When it's plowed in the fall?

Alan Rennie: When it's plowed in the fall.

Carolyn Bertram (L): I see.

Alan Rennie: It also gives the clover crop a chance to break down a little bit, which would give you a little bit more access to more nitrogen.

Tyler Wright: That's right.

Wayne Collins (PC)(Chair): Gentlemen, I don't think it's possible to overemphasize the importance of agriculture in this province and all facets of our life here, so that stated, you've mentioned in your presentation here today how agriculture may change and some of the tremendous challenges that face us, and we have things right now like mandatory crop rotation and the bumper zone legislation and it's important that these things occur in agriculture. I'm sure you would agree, so that we can mitigate the effects of climate change today, tomorrow and down the road.

Given that necessity to do that, I'd like to hear your reaction to some kind of cross-compliance regulations in that regard. I mean, right now, registered farmers do receive certain tax breaks from government. What would your view be if cross-compliance was extended to issues like crop rotation and buffer zones and such?

Alan Rennie: That's hard for a little farmer like myself to answer because it's going to implicate a lot of people, but that was brought up to me a few days ago and I thought that would be a pretty good idea to get compliance and crop rotation is pretty important to me and a little farmer like myself can handle that. Some of the bigger guys are struggling with it, but we've got to struggle with a lot of things, and you've got to adjust.

Wayne Collins (PC)(Chair): Gentlemen, thank you very much. I appreciate your presentation today.

Alan Rennie: Thank you.

Wayne Collins (PC)(Chair): I know we're running a little bit behind today, but I do want to ask the committee members - I know one committee member has to depart shortly for an important meeting they had pre-arranged earlier - but I certainly would beg your indulgence if we could go a little bit over our stated time of 4:00 o'clock, if that's okay.

Part IV - Bill Glen, Environment, Energy and Forestry

Our next presenter is Mr. Bill Glen, resource inventory and modeling manager with the Department of Environment, Energy and Forestry. Mr. Glen is here? Oh, there he is. Okay, are you going to take a little time to get set up there, Bill?

Bill Glen: Yes, I'm afraid so.

Wayne Collins (PC)(Chair): All right. I'm going to call our members back to the table and our next and final presenter of the afternoon is Mr. Bill Glen. Mr. Glen, welcome.

Bill Glen: Thank you.

Wayne Collins (PC)(Chair): And the floor is yours, sir.

Bill Glen: Thank you very much, Mr. Chairman and

honourable members. What I'd like to do is sort of think a little bit longer-term than some of the presentations that we've heard earlier today. Foresters tend to think in tree rotations, so 80 years is not a big deal. Some cases, you're even thinking longer, so we've heard some numbers from 20-40 or 20-50 from the agricultural people. Some of the things I'm going to present are sort of a 20-80 kind of period.

I'm not a climatologist, but I've been using resources that are readily available, and I would suggest, credible. I will show you. My background is in forest inventory and in tree breeding. The sources that I have used for this presentation are from the United Nations, the International Panel on Climate Change, Natural Resources Canada, Environment Canada, the US Climate Center, the University of Waterloo. It was a project done for the national parks in conjunction with Environment Canada, US Forest Service and the US Geological Survey, so I would suggest to you that they're fairly credible organizations.

I don't need to say too much about what climate warming is. People have addressed that fairly well. The forecast for Prince Edward Island for 2080 is higher winter temperatures - roughly three to five degrees, depending on the model that's used - higher summer temperatures of two to four degrees.

There is good consensus between temperature models. There is less consensus between the precipitation models. The extreme events have been well talked about, so I don't think I need to go into those. Climate change is happening roughly one degree over the last 100-odd years. Again, I don't think it's worth spending the time late in an afternoon.

The United Nations have put out this graph quite some time ago and the point I'd like to make from it is various models predict different increases over the next 80 years and the variation is in the - the difference, roughly, between a two and five-degree change by 2100. Those differences are based on human reaction to the issues. We've heard about mitigation and so on. The US has not bought into Kyoto. Canada has an awful long way to meet Kyoto. China is definitely not in and neither is India and a number of other developing countries, to say the least.

What will happen in 2100, in my mind, is the issue. We see the temperature increase between now and then in the graphics, but we don't know what happens after that. For trees, that's an issue. For agriculture, where you're changing your crops every one to three years, it's not such an issue you can't adapt, but what you put out there now if it's a long-lived hardwood species today will be there in 100 years' time, or could be there.

Let's make this a bit more local. The natural resources report provides some climate models and the one that they're using is this one and I apologize for the appearance on your screen. I think it may be your projector.

The projection for Prince Edward Island is if you can see, is the yellow, which is the four to five-degree range by 2080. Farther north, as you can see, Hudson Bay, a nine-degree increase. No wonder there's concern about polar bears and other things.

A lot of structural issues are happening in the north now with the melting of the permafrost. This temperature increase is unprecedented. The Holocene 400,000 years ago only had 2.5 degrees increase. We're talking, in some cases, nine for Canada, the northern parts of Canada and this is some of the more conservative estimates.

Charlottetown's mean temperature by month: The critical numbers there are January at -7 and July at 18.8 - roughly 19 degrees. That's where we are now. The red graph on top of the yellow is the last seven years, I don't think you can really say too much about it other than it's fitting the 30-year average fairly well, although it looks like it's a little bit warmer. I don't pretend that is necessarily a shift.

Remember, we're talking four to five degrees. Let's look at it a little differently. Charlottetown is the bottom graph. The next one up is Portland, Maine, which is a two-degree shift, approximately, so if you think of Portland, Maine, that's the kind of climate with a two-degree increase. Three degrees takes you to New York City and four degrees takes you down into Pennsylvania. And where are those places? You can see down the Eastern Seaboard.

So with a four-degree shift by roughly 2080, we're talking a climate something similar to Allentown, Pennsylvania. What is interesting to note right now

is Charlottetown has the same temperature as Cornwall, Ontario - Cornwall and Kingston, Ontario. They have different tree species than us.

What we have is a figment of the migration northward since the last glaciation. We had some cold areas in between us and the species in Maine and parts of New Brunswick. We should have more southernly species than we actually do now, but we don't because of our geographic positioning.

Andy Mooney (PC): (Indistinct)

Bill Glen: What I'm saying is southern parts of Ontario have the same climate as us.

Andy Mooney (PC): But different tree species.

Bill Glen: They have different tree species.

Andy Mooney (PC): What was the reasoning for the different - ?

Bill Glen: The reason is that the tree species weren't able to migrate north because they would have to go through parts of Maine and New Brunswick which are colder.

Andy Mooney (PC): Oh, okay, got you.

Bill Glen: And these species in Ontario are at the northern extent of their range now.

Andy Mooney (PC): Okay.

Bill Glen: This is a study that was done for the national park system and it was looking at protected areas. You can see that Prince Edward Island is on the border between the northern conifers and the southern, or then hardwoods. We're a transition zone. That's where we are, so we have both northern species and southern species. With the climate projections of warming, obviously the northern species are going to move north.

If I go to the next slide, you'll see the green band shift significantly up into Quebec, so all our boreal or northern species will leave. This is the most extreme example of one of the models. The reality will be somewhere between that and the present. It's definitely going to happen. All the models are suggesting at least a 500-kilometer north shift of your climate, so these -

Andy Mooney (PC): (Indistinct)

Bill Glen: Pardon?

Andy Mooney (PC): What are your northern species?

Bill Glen: If you just hang on, I'll come to that. The US Geological Survey has provided climatic parameters for major - basically all the tree species of North America - and they're the source for quite a bit of this information.

Part of this graph doesn't show up, I'm sorry, but what you have here, there is actually a very large area behind this, which is all the possible combinations, in this case, of January temperature versus July temperature, those mean temperatures, and if you remember, I said Charlottetown at the moment is -7 in January and roughly 19 in July.

This white birch, that is the intersection of those two criteria today. You're inside the black area, which is the zone of yellow birch climatically. With this four-degree increase in temperature, you move outside the climatic zone of white birch, so if you have a four-degree increase in temperature, white birch is no longer a species that's likely to survive here.

This one is done with precipitation, but it's the same issue. You move outside that area, you don't have the species. It is not adapted to the conditions that are here or would potentially are going to be here.

Wayne Collins (PC)(Chair): So probably by the year 2080, the white birch is going to be pretty much extinct to this province?

Bill Glen: Yes, that's correct. In the case of white ash, you can see with the temperature and moisture changes, you stay inside the climatic zone of the species. It's a more southern species. White birch is a boreal or northern species, and as I say, we're on the edge.

So we're on the edge of a lot of the more northern species now - on the southern edge - and we're on the northern edge of the southern species. We're in a good place to be compared to a lot of the rest of the country.

If we summarize the hardwoods, we end up with this, so the species that will benefit are oaks, elm, butternut, walnut, two of our three ashes. Ones that will be roughly neutral won't have a particular increase or decrease. Sugar maple is one that's slightly questionable at this point.

The ones that will lose are the northern species - your poplars, black ash, all of your birches will be gone if we have a four-degree increase in temperature, and alders, too, if you're a woodcock cutter, it's an issue, or grouse, in the case of the poplars.

Wayne Collins (PC)(Chair): I wouldn't miss the poplars -

Bill Glen: What that means in terms of our current forest volume out there today is our forest volume in the year 2000, 50 per cent was red maple, not a problem. Another 12 per cent was species that won't be particularly effected. The birches and the poplar, the other part of the pie - roughly 40 per cent - will not be components of our forest in 80 years.

If we do the same thing with the conifers, balsam fir, as you can see, with almost, say, roughly with two degrees, you'll be outside the climatic zone of balsam fir. If you're a Christmas tree grower, you're growing stuff on say, a 15-year rotation, you might not want to plant that crop in, say, 2065. You might not get to harvest it or it may be earlier than that. That part of the modeling exercise has yet to be refined enough to answer the question. The data is there and the models are there to do it, but I'm afraid I haven't got that far. In the case of white pine, we're fine. We stay inside the climatic zone of the species.

Interesting to note that we have field trials out and we've had them out now for seven years of white pine from throughout its range, the second-best seed source in our test is from Tennessee. So we can grow Tennessee white pine here now, showing a very plastic species in the sense of its climatic needs.

The softwood scenario is not anywhere near as good as it is with the hardwoods. We end up with only two of our native species remaining - white pine and hemlock. Southern species such as pitch pine - and there's a number of others - could be planted here. They will grow here now. There are small experiments out.

No change - two of our planted exotics - Norway spruce and Japanese larch - but all of these others - all of our spruces, two of our pines, fir, larch and cedar - which are all northern species, boreal species, will probably not survive in 2080. That represents 98 per cent of our current standing volume of conifers. Two percent of our volume is in white pine and hemlock, a significant shift in species.

The US Forest Service has done serious projections back in 1998. They clearly state that they're not completely sure that they're - what is going to happen. They have a caveat there. They do have a sense of humour and they say if they lose it, we gain it because we're north of them, but this is 1998 and we're now seven years later. The models are much more, what should I say? There's more comfort with the models and they're more refined, so some of their projections which they weren't so sure about in the past, they're more comfortable with.

Just to show what the forest types are down in the Eastern Seaboard and unfortunately, they didn't map Canada. You have, obviously, Maine and remember, this is the current situation in the US now based on their national inventory. You have Maine, this area up here being spruce and fir, and those who have driven down to Florida in the winter will know that halfway through Maine, your fir and spruce disappear as you're driving south. Or let someone else drive, you watch, but a two-degree shift, as you can see, takes us to Portland, Maine. So that takes us down to there and that is the maple birch-beech forest with basically none of your northern species in it.

Three degrees takes you to New York and that then takes you down into some of your oak, pine, hickory areas and again, quite similar if you went down as far as Pennsylvania. That's the current situation. They then have run their whole series of models. I won't bore you with them all, but there's five that they use, and they end up with this for the Eastern Seaboard of the US.

Wayne Collins (PC)(Chair): And what year is that, Bill?

Bill Glen: Sorry?

Wayne Collins (PC)(Chair): In what year are they projecting this?

Bill Glen: This is all 2080.

Wayne Collins (PC)(Chair): 2080?

Bill Glen: 2080, so spruce fir, which was in Maine, is now no longer in the US at all. The spruce fir forest is gone, and if you also note that maple birch-beech, which ran down through the middle of the Appalachian Chain, is also gone, so they're seeing a major shift. The main reason for that shift of some of those species, which will survive the temperatures, is probably evapo-transpiration. You've got warmer temperatures, but do you have enough water to feed them, which is an issue the agricultural people brought up earlier, so there are major forecast changes in forest types.

It's not just us. The US has been saying this for some time. I guess the question is: Well, what do we do? Option number one. Option number two is obviously be a bit more proactive. A new forest policy is under debate at the moment. It includes something on climate change. I think it would be very remiss if it wasn't.

Activities dealing with trees that the provincial government is involved with. I think it should be considered whether it's a greening spaces project in someone's riding - we would certainly like to recommend that they use species that will have the longevity with climate change as opposed to some of the other species.

This has been alluded to by most of the speakers this afternoon is we have excellent information on our province. Our province is recognized as being part of the most susceptible - the most susceptible province in the country for erosion, for soils. Also looking at the climate issues with regard to - fisheries may be stretching a little bit because there isn't that much data, but certainly with regard to agricultural crops, infrastructure and so on.

With the Corporate Land Use inventory that we have and the previous inventories, the soil information, the contour information, I appreciate the Lidar projects that have been suggested twice this afternoon would be an improvement, but we have a good data set. The federal government, in my mind, is looking for projects. We could be a pilot for the country on how you adapt to climate change. We've got the resources, electronic resources in mapping and knowledge of our province to do it. It's a suggestion.

Short-term specifics: We need to look at what we have out there in the field. Our existing tree improvement tests that are out there, they can tell us a lot. There are northern source seed sources planted. Are they an early warning system for us? We have black spruce that's come from, say, 58 degrees north. If we examine those, are we starting to see those die now? We're at 46, by the way.

Wayne Collins (PC)(Chair): But Bill, is this what you're talking about -the demonstration wood lots? Is this where we're seeing some of this planted?

Bill Glen: Some of this material is. Quite a few of these range-wide tests, so-called, are in conjunction with the Canadian Forest Service, so we may have, say, two replicates, two field experiments in PEI, and there may be five or six more in the Maritime or Atlantic region. We may be able to look at some of those and see what is actually happening.

You don't expect a more northern seed source to do as well as the local one, but if it seems to be dying prematurely and in two or three years' time, you get the next-more northerly one dying, it's an issue and we're starting to see it.

Wayne Collins (PC)(Chair): But they're like living barometers (Indistinct), is that right?

Bill Glen: Living barometers. They're sort of the canary in the coal mine concept. That material is out there. The other material that's out there is the planted material from farther south that we have there for various reasons. The white pine, as I just mentioned. There's a lot of information that we need to look at and examine.

We're going to identify some species that we're going to lose. I've given you my impression at this stage. Southern Ontario has the so-called Carolinian species, which we know some of them will grow here now. I believe we should establish some small experiments to see if they'll grow here now, and if they will, you have a seed source for the future.

The other alternative is, obviously, to try some of our material farther south now to see if it'll grow

down there, in say, in Pennsylvania. I suspect it won't because it's outside the climatic range, but it is something one could look at.

I'd rather bring things from the south here as opposed to taking our stuff south. You know it dies down there. Okay, that confirms what you thought. I'd rather bring things up here and see if they grow and look ahead as opposed to looking backwards, and that should result in us starting to look at our nursery output now, which is primarily boreal species, primarily spruce is our major species, and start looking at shifting that as the predictions become a bit more firm on when those species are no longer to be viable. And if, say, for example, white spruce is no longer viable in 2060 and you grow it on a 40-year rotation, then by 2020, you should stop producing it in the nursery.

I'm not sure what those time frames would be at this stage, but those are the sorts of issues I believe we should start to look at. I consider this not an end, necessarily. It's the end of the Acadian forest that we know. It's the beginning of a new Acadian forest with species that we might have had depending on different scenarios.

The forest that we're planting now, 2080 is only 75 years away. Your grandchildren will probably be there to see it, and I think it's up to us to make sure there's something that's appropriate and not something that's going to be under stress. Thank you, very much.

Wayne Collins (PC)(Chair): Bill, a great presentation. Mr. Mooney?

Andy Mooney (PC): I know one thing. Martinus Rose now that has a hardwood plant at Pooles Corner. One thing he advocates is that when we're planting some of the spruces and different things that it - let's say when they do hit maturity, they're probably worth, let's say, $100 a tree.

If you planted walnut or some of these different other types of species, they'll take longer to mature, but they're probably worth 10 times as much. Do you think there should be more work even on the economics? Even taking this into account, it makes more sense, I guess, but -

Bill Glen: Well, certainly, traditionally spruce and so on has been the bread and butter of the industry, whether it's been pulp or saw logs or so on. There's no question that individual hardwood trees can be extremely valuable.

The issue becomes is how many of those do you actually have? On an average wood lot, to have the quality that Martinus might be suggesting for veneers, for example, or select lumber, on an average wood lot on PEI, you might have three trees, which is fine if you can get those three trees to somebody who's willing to pay it and can you afford to put three trees roadside, but I do hear your point and I agree that here's an opportunity to start looking at some of those more valuable hardwoods.

Andy Mooney (PC): I think some of the points I hear from some, too, is even on the plantings, if it's done as a mix, that it's not like, I guess some of the hardwood trees do better if they're, I guess, not much more than I, but he was saying - or somebody was telling me that even if some of these expensive trees were just even mixed in here and there.

Bill Glen: I would agree that the best or sort of the - not all your eggs in one basket is a good scenario to put it. If you put a mixture on the landscape, if you lose one or two, you're not so bad. If you lose everything, then it's obviously an issue.

Andy Mooney (PC): Just one other quick question. When you were mentioning in 80 years on some of the graphs, a lot of our trees are going to be gone, a more southerly variety would probably thrive here?

Bill Glen: Yes.

Andy Mooney (PC): Every once in a while, we'll still probably get wicked cold snaps in the winter, being where we are. Can those southerly trees handle that if they have a week or two weeks of -30?

Bill Glen: It depends on the species, and that's why I think we should have a look at some of them now. If we plant them out now, say for the next 10 years, hopefully we will get a good cross-section of those kinds of temperatures and by examining what is out there right now, one tree from Southern Ontario is called the tulip tree.

It has good timber qualities, it produces nectar for insects, it produces a fruit for birds and so on, so

it's got a nice ecological niche, if you will. It doesn't generally grow here. There's one out in the village of York. I don't know how old it is, but it's about 60 centimeters diameter, so obviously there's a species that has survived there that long.

Andy Mooney (PC): Just a last point. Do you have a copy of your presentation or can you - ?

Bill Glen: I have a copy to leave with the clerk.

Andy Mooney (PC): That was a very interesting presentation.

Wayne Collins (PC)(Chair): Ms. MacDonald?

Helen MacDonald (PC): Yes, I enjoyed your presentation, too, Bill. Something you mentioned that I was really pleased to hear is maybe the alders will be gone. I'll be very, very pleased to see those gone because every time I go down to the back end of the field, the darn things keep growing.

Bill Glen: There will probably be something else that will fill that ecological niche, I'm afraid. Red maple, probably.

Helen MacDonald (PC): Bill, you haven't mentioned the fruit trees.

Bill Glen: No.

Helen MacDonald (PC): Now an apple tree, will we be growing a different apple than what we're growing now or -?

Bill Glen: I'm afraid it's really beyond my initial knowledge, but certainly you do see fruit trees farther south, including apples, so I would suggest probably. Whether it's, as you say, as a different species, I don't know. You may be able to grow -

Helen MacDonald (PC): Like a BC Delicious or something like that?

Bill Glen: I don't know.

Helen MacDonald (PC): That perhaps takes different growing than we have?

Bill Glen: I suspect the answer is, yes but I'm afraid I don't have the answer for you.

Helen MacDonald (PC): Great. Thank you.

Wayne Collins (PC)(Chair): Ms. Bertram?

Carolyn Bertram (L): Yes, I just have a quick question, though. The nursery, can people go out to the nursery and get, say, a beech tree or are we replanting some of those old stands that we used to have, the beech or the red maple and all of our provincial tree, all of that red oak, I'm sorry, not the red maple.

Bill Glen: The nursery doesn't provide trees to individuals. It provides them, in some of the cases, through the garden centres where an individual can go and buy them. Handling one tree when we're set up for hundreds of thousands is cumbersome, I guess, is the best way to put it, inefficient. However, there are a number of programs through which you can get these trees for yourself.

Carolyn Bertram (L): I'm just thinking even - not that I agree with clear-cutting, but let's say a field, it's gone, the trees that were on it. The people who come out to reforest that area, do they come out? Are we just primarily - the statistic, is it spruce seedlings, pine? Are we using those old stands, the old seedlings?

Bill Glen: Primarily most of the species that are planted at the moment are spruces, certainly. The three spruces are primarily the biggest ones, followed by a number of the pines, and then there's larch and (Indistinct).

Carolyn Bertram (L): Is it more expensive to raise?

Bill Glen: It's much more expensive. If you're starting with a grass field as opposed to, say, a cut-over, most of the hardwood species that you plant will be consumed by the mice and there's really no efficient way of controlling that.

If you do wish to convert a field into a deciduous or hardwood forest, what I would recommend you do is plant it to spruce and probably at about age 15 or 20, when there's no longer any vegetation from the field left, so the mice are no longer there. Then you could cut strips through it or cut holes in it and then plant your hardwoods. You've got to get rid of the mouse habitat or else you will defeat yourself.

Carolyn Bertram (L): So just one more question

with regards to The Green Spaces Program, the Greening Spaces Program, are those just seedlings that are provided through that program or is it - because I know a lot of schools have benefitted from the Greening Spaces Program.

Bill Glen: There are various types of planting stock that go through that program. I'm afraid I can't give you the absolute definitive answer. Certainly there are seedlings available. I know that in some cases, schools have established their own nurseries using seedlings, growing them on and then planting them.

There have been some larger plantings done, the case of the red oaks last year. They were large trees , there were 15-foot trees were sort of a special project for all the schools. There's a whole range of variation you can have through that program.

Carolyn Bertram (L): I always thought it would be neat if when a child is born on PEI, wouldn't it be neat that a tree would be available for them.

Bill Glen: It is.

Carolyn Bertram (L): Oh, it is?

Bill Glen: They get a certificate at the hospital.

Carolyn Bertram (L): Oh, they do?

Bill Glen: And they can bring those in and they get a red oak seedling.

Carolyn Bertram (L): Okay, thanks.

Andy Mooney (PC): I was at a wedding last summer, just to change the subject.

Carolyn Bertram (L): Yes.

Andy Mooney (PC): Or a couple of summers, and there was somebody from Western Canada and they give jack pines or something out, whatever it was, the tree from where they come or jack pole pine or something.

Bill Glen: Lodgepole, I think, probably.

Wayne Collins (PC)(Chair): They're on the way out, though, right, in 2080?

Bill Glen: Depending on where exactly you are. Jack pine for PEI is definitely on the way out. We're very much on the edge of that one right now.

Andy Mooney (PC): The ones I got were on the way out. I forgot to plant them.

Wayne Collins (PC)(Chair): A quick question. We've heard the term Lidar again today. It's come up a few times in our various presentations. You say we already have a pretty good land database of different sources right now, but if we were tomorrow, to recommend having the Island done with this Lidar, which I'm told is as sophisticated as you can get at the moment. Is it?

Bill Glen: Yes.

Wayne Collins (PC)(Chair): How expensive is that?

Bill Glen: You're talking millions of dollars.

Wayne Collins (PC)(Chair): Millions of dollars.

Bill Glen: Millions of dollars. There's a number of things to look at. The most detailed data you need is along the coast, so a 30-centimetre increase in water can be very critical. Thirty centimetres inland, it's not quite so critical. You may be happy with a half a metre kind of resolution inland farther.

So you could do the province in two different ways. You could do the coastline very detailed and inland, you could do it slightly less detailed for less money, but it definitely is an expensive proposition. The existing contours we have are two-metre contours based on the photo interpretation of 1958 photographs.

Richard Brown (L): (Indistinct)

Bill Glen: We don't update the contours, no. Our land use information is updated to 2000. The contours have been updated very little.

Wayne Collins (PC)(Chair): Is that something that provinces have to undertake themselves alone? I understood today from the gentleman from Soil and Crop Improvement that there might be some federal monies available to do that kind of work

Bill Glen: I believe - my impression of some of the

discussions that I've been privy to is there's a good chance there could be significant federal monies available to do such a project and by asking for more than we may hope to get, we may get something, certainly with regard to the mitigation issues on infrastructure and those sorts of things. The Emergency Measures people, the coastline stuff, I think the chances are pretty good at getting that. Inland is a little iffy.

Wayne Collins (PC)(Chair): And if we sell ourselves as the prototype for climate change because we do have the smallness to be able to handle that, maybe we could get a little bit more.

Bill Glen: That's right. We are recognized within the country as having good data on the forestry perspective now. We're doing a project with the Canadian Forest Service in British Columbia with regard to Kyoto deforestation on forestation issues.

Because we have the best inventory in the country, we can look at 1990 versus 2000 and see if the one minus the other actually gives you deforestation. Now I know it doesn't give you it entirely because it may no longer be a forest block. It may be a residential block with trees, so those issues are being looked at and this report that will come out of it will be a model for international processes and saying: No, you can't compare inventory to inventory. You have to do so much more to it. But that's the kind of level of recognition we're now getting for what we have.

Wayne Collins (PC)(Chair): Bill, thanks very much.

Bill Glen: You're quite welcome.

Wayne Collins (PC)(Chair): I appreciate your input to the committee. We're going to have a short in-camera session, if that's okay, to discuss our next step, so we'll wait until Bill gets his gear out of there.