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Chair

Mr. John Aldag

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● (1535)

[*English*]

The Chair (Mr. John Aldag (Cloverdale—Langley City, Lib.)): Good afternoon, everyone.

Welcome to all of our presenters today.

This is the start of a new study. It was a motion adopted back on February 1 of 2018 to dedicate six meetings to studying the pan-Canadian framework on climate change and this one is looking at forestry, agriculture and waste.

We'll be having witnesses for the next three weeks, essentially, and then get into our report, possibly before Christmas.

With that, I'd like to welcome Mr. Aboultaif, as a guest with the committee today.

Mr. Ziad Aboultaif (Edmonton Manning, CPC): Thank you.

The Chair: I believe we have two presentations from the department.

Ms. MacNeil, are you ready to go? You'll have 10 minutes.

Mr. Scarpaleggia, it's also good to have you.

For anyone who's new to the committee, I'll use my cards to give a one-minute signal, when you're almost out of time, and then a red card for when your time is up. You don't have to stop immediately, but wrap up your thoughts. That will apply when we go through the rounds with our members as well.

With that, Ms. MacNeil, if you have others in your delegation from your department you'd like to introduce, you're welcome to do that.

Ms. Beth MacNeil (Assistant Deputy Minister, Canadian Forest Service, Department of Natural Resources): Can we do introductions right away, before I start?

The Chair: Sure. Do that right away and then we'll start the clock with your presentation.

Ms. Beth MacNeil: We're all from Natural Resources Canada, from the Canadian Forest Service.

We have, joining us online from our Pacific Forestry Centre, Dr. Werner Kurz, senior researcher on climate change. We have Dr. Anne-Hélène Mathey, who manages our climate change programming, and we have Dr. Tony Lemprière, manager of climate change policy.

Can I pass it over to my colleagues?

The Chair: Sure.

Let's do that and then we'll get into the presentation.

Ms. Judy Meltzer (Director General, Carbon Pricing Bureau, Department of the Environment): Hi, it's Judy Meltzer. I'm the director general of the carbon pricing bureau at Environment and Climate Change Canada.

The Chair: Welcome back.

Mr. Vincent Ngan (Director General, Horizontal Policy, Engagement and Coordination, Department of the Environment): I'm Vincent Ngan, the director general of horizontal policy and engagement for the pan-Canadian framework implementation office, with Environment and Climate Change Canada. I have the longest title.

Thank you.

Mr. Matt Parry (Director General, Policy Development and Analysis Directorate, Strategic Policy Branch, Department of Agriculture and Agri-Food): Good afternoon. I'm Matt Parry. I'm the director general for policy development and analysis at Agriculture and Agri-Food Canada.

Mr. John Fox (Director General, Innovation Programs Directorate, Programs Branch, Department of Agriculture and Agri-Food): Hi, I'm John Fox. I'm the director general of innovation programs at Agriculture and Agri-Food Canada.

Dr. Javier Gracia-Garza (Director General, Ontario - Quebec Region, Science and Technology Branch, Department of Agriculture and Agri-Food): Hello, I'm Dr. Javier Gracia-Garza. I'm the director general for the Ontario-Quebec region for the science and technology branch of Agriculture and Agri-Food Canada.

The Chair: Thank you, everybody.

You have 10 minutes for your opening statement.

Ms. Beth MacNeil: Thank you very much, Chair.

I forgot to mention that I am the assistant deputy minister for the Canadian Forest Service.

Good afternoon, gentlemen, and lady, around the table. Thank you for the opportunity to discuss the importance of forests and the forest sector and their role in Canada's clean growth and climate change strategy. We are, I believe, at a pivotal moment when climate change is one of the greatest challenges of our generation. Investing in science, clean technology and innovation is the new imperative for a low-carbon economy.

We believe there can be no global solution to climate change without the forest sector. That statement is backed by science. Keeping global temperature increases to two degrees or less means we need to very substantially reduce fossil fuel emissions and increase land-based carbon sinks.

The work of the Intergovernmental Panel on Climate Change makes it clear that forests, in particular, have a large role to play. The IPCC says:

> In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon [sinks], while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit.

Federal programs are important, but, as you know, provinces and territories control the majority of the land base and resources. I am encouraged that provinces and territories are taking greater interest than ever before to understand the potential to reduce GHG emissions and increase carbon through actions involving forests and wood use.

If we consider forest carbon estimation, the managed forest in Canada covers 226 million hectares. The annual GHG inventory report shows that our managed forest already absorbs vast amounts of carbon from the atmosphere. At the same time, harvesting results in storage of carbon for decades in products such as lumber used in housing, even though, over time, there are emissions when the products are eventually disposed of.

When we consider the role our managed forests in Canada play, as a source or a sink, we need to consider three things: first, how forest management affects emissions and removals; second, the carbon stored in wood products; and third, how forest products and bioenergy can replace other products and fossil fuels that produce more emissions.

Canada's GHG inventory shows that our managed forests and associated products were a net sink of 27 megatonnes in 2016. It's important to note that this does not include the impact of fire or vast pest infestations such as the mountain pine beetle. Those two alone resulted in emissions of about 90 megatonnes in 2016.

How do we produce these numbers? At Natural Resources Canada, we use the national forest carbon monitoring accounting and reporting system. At its core is the forest carbon budget model, a model initiated in 1989 by Canada—by us—continuously improved since then, and internationally recognized and adopted by many countries.

I'll touch briefly on forests and climate change mitigation. The key question here is, what can we do to increase the carbon storage and reduce GHG emissions associated with forests and wood products? NRCan has looked at this question in collaboration with our partners in the provinces and territories, and some of the analysis was done in preparation for the pan-Canadian framework on clean growth and climate change.

The analysis shows that mitigation actions with significant potential for emissions reductions in the long term, by 2030 and beyond, include four things. The first is forest management actions, such as enhancing restoration of forests after fire and insect damage like we see in British Columbia and Alberta, and ensuring maximum utilization of fibre, including residue.

The second is increasing afforestation to create new forests, using marginal agricultural land—planting trees.

The third is increasing the use of long-lived wood products to replace more emission-intensive materials, for example, replacing concrete and steel with mass timber buildings wherever possible.

● (1540)

Finally, fourth is increasing use of wood for bioenergy in place of fossil fuels, for example, by reducing burning slash piles of harvest residues. We can use these in the form of pellets for bioenergy and bioheat.

By 2050, carbon sequestration in forests and wood products could represent one of the largest mitigation opportunities for Canada. However, note that the actions need to take place today and in the near term if we are to achieve this benefit by 2050, because in Canada it takes a long time to grow trees.

These analyses informed the pan-Canadian framework. The PCF commits us to enhancing carbon storage in forests, generating bioenergy and bioproducts, encouraging greater use of wood in construction projects, and advancing innovation for GHG-efficient forest management practices. When Canadians think of how forests can help mitigate climate change, it is often limited to notions of tree planting, but that isn't the case from our perspective. Similarly, conservation appears like a good opportunity to leave the forests in place and not harvest them, but that is without taking into account the increasing frequency of fire and insect outbreaks, and without considering what would replace wood products if we reduce harvest, so that you're using more emission-intensive products. Conservation is definitely important, but it's often not the most effective long-term GHG emission strategy.

One pan-Canadian framework commitment involves looking at innovative practices in the forest sector to increase stored carbon in forests. ECCC's low-carbon economy fund is providing support in the order of $202 million in this area. B.C., Alberta, Quebec, P.E.I. and the Northwest Territories are accessing this to accelerate restoration of forests after fires and pest insects, and they're planting new forests.

A second PCF commitment involves increasing the use of wood in construction to store carbon over the long term. This increases the use of a renewable resource, while replacing conventional emissions-intensive building products, and is a goal of our NRCan $40-million green construction through wood program. An example of this is Brock Commons, at the University of British Columbia. Up until about a month ago Canada was a world leader in having the tallest wood building—18 storeys built in nine and half weeks.

A third pan-Canadian framework commitment involves identifying opportunities to produce renewable bioproducts and fuels, something that we're quite proud of. To this end, $55 million of NRCan's $220-million clean energy for remote and rural communities program—we call it CERRC—is supporting projects to replace fossil fuels with local forest biomass for heating, and we're focusing on indigenous communities across Canada to do this.

These are just some of the ways the forest sector will help us tackle the key issue of climate change, as well as lead environmental performance, drive clean growth and innovation, and at the same time make real reconciliation with indigenous peoples.

Here are some key points as I close. We cannot forget that forest carbon emission and storage is not only affected by humans but by the changing climate itself, which increases the frequency and magnitude of fires in Canada, has an effect on growth rates and survival, and enhances insect outbreaks. The last two fire seasons in the west, as well as the outbreak of mountain pine beetle and the spruce budworm infestations on the east coast, are all causing large emissions.

We need to think about what actions can reduce GHG emissions, while contributing to climate change mitigation. Our federal programming is doing a lot, and I believe further opportunities exist.

Thank you.

● (1545)

The Chair: Thank you very much.

Mr. Parry, you're going to make comments from the Department of Agriculture and Agri-Food.

Mr. Matt Parry: Yes, thank you very much.

Thank you for the opportunity to be here today with my colleagues from the department to discuss greenhouse gas emissions from the agriculture sector, as well as the role of the sector in contributing to emissions reductions and the transition to a low-carbon economy.

As I'm sure you know, the pan-Canadian framework is a comprehensive plan to grow the Canadian economy while reducing emissions and building resilience to a changing climate. The agriculture sector has an important role to play, as it accounts for approximately 8.5% of total emissions in Canada. These are figures from the most recent greenhouse gas inventory report.

Total agricultural emissions from livestock, crops and on-farm fuel use have been relatively stable since the mid-1990s, despite significant growth in agricultural production over that time. This indicates an important decoupling of emissions and production, as farmers have become more efficient and adopted sustainable practices and technologies.

It is important to note that unlike many other sectors, most agricultural emissions do not come from energy use, but rather from biological processes. In this regard, the three main greenhouse gases produced by agriculture are methane, nitrous oxide and carbon dioxide, which come from ruminant digestion, manure and fertilizers, as well as soils and on-farm fuel use.

Given the nature of these emissions, efforts to reduce greenhouse gas emissions are often focused on science and innovation, supporting on-farm actions to enhance efficiency and adopt more sustainable practices and technologies.

The Canadian agricultural partnership is the primary mechanism by which the agriculture sector will contribute to Canada's transition to a low-carbon economy, as well as the three specific actions identified in the pan-Canadian framework, which I'll come to shortly.

I'll just give a bit of background concerning the Canadian agricultural partnership. Since 2003, federal, provincial and territorial governments have used intergovernmental policy frameworks to collaborate and coordinate efforts on agricultural issues, which is obviously important, given agriculture is a shared jurisdiction in Canada.

Building on past successes, Canadian ministers of agriculture launched the most recent framework, called the Canadian agricultural partnership, on April 1 of this year. The partnership is a five-year, $3-billion investment that will strengthen the agriculture, agri-food and agri-based product sector, ensuring continued innovation, growth and prosperity. It aligns federal, provincial and territorial policy and program priorities while providing provincial and territorial governments with the flexibility to address regional priorities and issues.

Federal, provincial and territorial ministers of agriculture have identified environmental sustainability and climate change as one of six priorities under the partnership.

Through the partnership, the Government of Canada, together with the provinces and territories, will provide funding to help this sector grow sustainably in three broad areas: reducing greenhouse gas emissions from the agricultural sector; protecting the environment, including soil and water; and helping the sector adapt to a changing climate.

More specifically, with respect to reducing greenhouse gas emissions, the pan-Canadian framework identified three specific areas for action: first, increasing the stored carbon in agricultural soils; second, generating bioenergy and bioproducts; and third, advancing innovative practice to reduce greenhouse gas emissions.

This will be accomplished through a variety of programs, some delivered by Agriculture and Agri-Food Canada, and others cost-shared with provincial and territorial governments. I would note that a significant portion of Agriculture and Agri-Food Canada's funding under the partnership is focused on science, research and the development of innovative practices and technologies.

With respect to on-farm environment cost-shared programs, they deliver the practices and technologies developed through upstream science and innovation activities. Provinces and territories design and manage the delivery of these programs, which allows the programs to be tailored to each jurisdiction's environmental priorities. In particular, these programs build producer awareness and knowledge of environmental risks on farms. Based on these risk assessments, they provide financial incentives to producers to adopt innovative beneficial management practices to reduce these risks, including climate-related risks.

● (1550)

Canadian producers have adopted technologies and practices that both build resilience to climate change and reduce emissions by improving production efficiency and increasing agricultural soil carbon. For example, Canadian farmers are increasing their adoption of new precision agriculture technologies, such as variable-rate irrigation and smart fertilizers, which save valuable water resources, use fertilizer resources more efficiently and lower greenhouse gas emissions.

I would note that in addition to the Canadian agricultural partnership, there are some programs that will contribute to further action on climate change in the sector. There are two specific examples to note. In budget 2017 there was an announcement of funding of $70 million over six years to further support agricultural discovery, science and innovation, with a focus on addressing emerging priorities, such as climate change and soil and water conservation. Budget 2017 also announced $200 million over four years for innovative clean technologies for Canada's natural resource sectors, including $25 million in funding in agriculture for the development and adoption of clean technology in the sector, and also to produce advanced materials and bioproducts based on agricultural outputs.

In conclusion, through the adoption of innovative practices and technologies, the agriculture sector has made important advances in increasing efficiencies, reducing greenhouse gas emissions, conserving soil and water, and building resilience to a changing climate. Through Canadian agricultural partnership and other complementary funding, the federal government, in collaboration with provincial and territorial governments, will support industry efforts to enhance the sustainability of the Canadian agricultural sector.

Thank you for your time. My colleagues and I would be pleased to answer any questions.

The Chair: Excellent. Thank you.

We'll move into our rounds of questions now. They're all six minutes except for the last one, which is three. I do hope that our members of Parliament remember at some point to invite Mr. Kurz, from Victoria, to join in the conversation. Perhaps he could tell us how great the weather is in Victoria today, how warm, so those of us in Ottawa can feel really bad for being here instead of there.

Anyway, with that we'll start off with the questioning.

First up is Mr. Fisher for six minutes.

Mr. Darren Fisher (Dartmouth—Cole Harbour, Lib.): Thank you very much, Mr. Chair.

Thank you all for being here. I appreciate it.

I'm particularly thrilled that Agriculture and Agri-Food Canada is here today, because I just have to ask this question. I've been hearing about one of your scientists, Wade Abbott, researching why feeding seaweed to cows helps them be less gassy—

Voices: Oh, oh!

Mr. Darren Fisher: —or produce less methane, I guess, would be the proper way to say it. We have cows in the Maritimes being fed this diet in order to reduce emissions. Is this something your department is actively working on? Did someone stumble upon this? Is this just one of the innovations? If so, what are some of the other agricultural innovations to reduce GHGs?

I'm looking at Matt, but I'm....

Mr. Matt Parry: I'm looking at my colleagues.

Mr. Darren Fisher: It's fascinating.

Dr. Javier Gracia-Garza: It is indeed fascinating, and thank you for the question.

I'm certainly not the expert. Wade Abbott is the scientist who has been working, among other scientists in Agriculture and Agri-Food Canada, looking at different types of additives or alternatives in feeding livestock, with the goal of reducing methane production. There is not only that, but I think there are several venues being explored. I cannot necessarily list all of the different products or alternatives that are being used, but there is capacity certainly within Agriculture and Agri-Food Canada that has been looking at the issue of the different, I will say, nutrition for livestock, but also to better understand the microbes that are in the gut of ruminants.

There is a strong interaction, and we are taking a much more systemic approach to looking at how we can, through different systems, reduce these GHG emissions from livestock and also from crops. Microbial communities in the ruminants, as well as the foods they are being fed, are areas we are actually exploring in our research in different parts of the country, for beef production in Alberta with Wade Abbott but also in Quebec and in the Maritimes.

● (1555)

Mr. Darren Fisher: That's very cool.

Sticking with methane but moving over to ECCC, we know that solid waste produces methane and GHGs. In Nova Scotia, particularly in the Halifax Regional Municipality, they do a very good job on solid waste. What is the federal government doing to support municipalities to increase the capture of methane through landfill gas collection?

Mr. Vincent Ngan: I will try to answer, although I am not in the waste management aspect.

To give you some statistics, in Canada, methane generated by landfills has increased by almost 6% since 2005, from 970 kilotonnes to 1,027 kilotonnes, primarily due to the growth of population and the generation of degradable organic waste in municipal landfills.

That being said, the increase in methane generation has also been offset by an increase in the capture of methane in municipal landfills, from 32% to a total of 44% in 2016. A lot has been done due to the fact that provincial governments put in place regulatory requirements and measures that the major landfills have carbon capture mechanisms.

Government funding to support low-carbon initiatives also contributed to the reduction of landfill methane emissions, such as funding provided through the Federation of Canadian Municipalities, direct funding provided by the Government of New Brunswick, and Quebec's biogas program. Some landfills in Quebec and B.C. have generated carbon offsets in the California market as well.

Based on recent research conducted by our department, landfill gas capture systems are in place or under development at approximately 94 out of 130 of the largest landfills in Canada, and an additional 23 out of 149 medium-sized landfills that serve a population of 12,000 to 50,000.

This is the progress that has been made, so definitely there are good practices. A case in point is that the landfills that do not have capture systems have developed some, and for those that have capture systems, they've found ways to improve efficiency. There are definitely provincial and federal efforts to together help reduce the generation of methane in landfills.

Mr. Darren Fisher: I have only about 45 seconds, so I'll ask a short one and maybe go to Natural Resources.

We know that severe weather and climate change are real problems. Forest fires are important for new growth, but also contribute to GHG emissions.

How can we best manage forests to ensure proper growth while managing public safety and environmental concerns?

Ms. Beth MacNeil: Thank you.

I'm going to turn to Dr. Kurz.

You have 35 seconds.

Dr. Werner Kurz (Senior Research Scientist, Canadian Forest Service, Department of Natural Resources): No challenge at all.

The fundamental issue with forest fires and their increases over time—and they have increased threefold in the last 50 years in terms of area annually burned—is that we have a combination of warming temperatures, reduced precipitation and increased periods of drought that together have led to an increase in forest fires.

How we can best manage forests is a longer question, but it would include reducing fuel loads. There is a recognition that in some areas of the country, a century of fire suppression has resulted in forest conditions that have a significant amount of fuels within them. There are ways to manage these and also then use some of these fuels—the wood—in climate change mitigation strategies.

With the allotted time, I'll leave it at that. I'm happy to come back to this later.

Mr. Darren Fisher: Thank you.

The Chair: Perfect. Thank you for the comments.

We're going to move now over to Mr. Lake, for six minutes.

Hon. Mike Lake (Edmonton—Wetaskiwin, CPC): In the spirit of non-partisanship and co-operation, I'm going to pass my time on to Wayne Stetski.

Mr. Wayne Stetski (Kootenay—Columbia, NDP): Thank you. I am going to pass my six minutes back to Mr. Lake in a minute.

Thank you for being here today.

My first question will be for Agriculture.

I have a bill, which is in the Senate, Bill C-281, to celebrate national local food day on the Friday before Thanksgiving every year.

The purpose of it is to shine a spotlight on the importance of local food across the country. As you know, it's important for food security and for the local economies. It's also important for the environment, particularly in the reduction of carbon emissions, to grow your food locally rather than shipping it in from across the country or around the world.

Are there any financial incentives in the packages you mentioned, Mr. Parry, or perhaps Mr. Fox, since you're in innovation, that the people in my riding of Kootenay—Columbia and other local growers across the country can access out of this funding you mentioned earlier?

● (1600)

Mr. John Fox: As Matt mentioned earlier in his opening remarks, part of the reason for our framework is to try to align federal and provincial activities to make sure they're moving in the right direction.

Federal activities tend to be, on the marketing side, focused on export activities. We have a lot of work that we do with provinces on exportability.

The provinces themselves look at linking local producers with local markets. Under the cost-shared arrangements that we have in place, some provinces—not all provinces, and it varies by provinces—have put in place supports to local farmers' markets, mechanisms by which they'll support either the enhancements of those local farmers' markets, or linking local producers into those farmers' markets. However, those exist at the provincial level.

Mr. Wayne Stetski: You said you provide funding through provinces to do this. Could you, therefore, you put in some requirements in terms of benefiting local growers when you're handing out money to the provinces?

Mr. John Fox: The framework is a five-year start and finish. This is the first year of the five-year framework. What provinces do under the cost-share arrangements is provide the full range of what they intend.... There's $2 billion tied up in these frameworks, and they'll submit to us what their intended programming is and what their priorities are, and then we negotiate an agreement that lasts five years. Those agreements are now all in place with all provinces, and they're rolling out their programs now. Those agreements can be made public.

Mr. Wayne Stetski: All right.

Turning to forestry, my colleague Richard Cannings from South Okanagan—West Kootenay has a bill before the Senate as well, Bill C-354 on the use of wood. It's asking government to do an analysis of the carbon footprints of structural materials. His initial emphasis, of course, was wood and supporting the various mills in our ridings. To what extent could increasing the use of wood products in construction help reduce the use of more carbon-intensive materials?

Ms. Beth MacNeil: Tony, would you like to take that?

Mr. Tony Lemprière (Senior Manager, Climate Change Policy, Canadian Forest Service, Department of Natural Resources): Yes. Thank you for that question.

I think all of the analysis that we have done in the Canadian Forest Service of NRCan—and has also been done elsewhere in the world—does indicate that using wood can make a contribution to climate change mitigation, in particular, using long-lived wood products in construction where they can replace other more emissions-intensive materials like concrete or steel.

As the assistant deputy minister mentioned, NRCan does have a program, the GCWood, or green construction through wood program that is aimed at essentially supporting those types of efforts. That program does a number of things. It's seeking to support demonstration projects for more use of wood in what might be called non-traditional construction, tall wooden buildings, for example, or commercial buildings or bridges.

The program is also going to support efforts to have building codes changed in 2020 or 2025 to allow taller buildings to make more use of wood.

Finally, it's going to support educational and training programs for architects, engineers, etc., and the development of tools that they can use so that wood construction or wood-based construction becomes something that they're more aware of and interested in.

The short answer is, yes, there is a lot of potential that we see from using wood for construction.

Mr. Wayne Stetski: I want to turn to the Paris targets and forestry again. What do you see as the role of forests in terms of meeting Canada's Paris targets? I understand there might have been some changes in what's going to count and not count towards meeting that target. Could you address that for a minute, please?

Ms. Beth MacNeil: I've spent hours figuring that out. We call it LULUCF: land use, land use change and forestry.

Tony or Werner, who would like to explain in plain language?

● (1605)

Mr. Wayne Stetski: Along with that, I might add that we already did a protected area study, and we had several people before us who suggested we should be protecting 50% of our boreal forests moving forwards. If that becomes part of the conversation, that would be interesting.

Mr. Tony Lemprière: It's a very important question and, indeed, under the Paris Agreement and through the whole history of international climate change negotiations and efforts, there has been a lot of interest in the use of forests to contribute to mitigation targets under the Paris Agreement and in previous agreements.

One thing I think really informs that is that we know addressing climate change is a huge challenge, so all sectors have to be involved.

I'll try to finish up quickly.

In terms of Canada, we certainly do see a lot of potential for forests and the use of wood to contribute to our 2030 emission reduction target and in the longer term for post-2030 targets as well. Given the warning that I had to end, I'll stop there, and we can hopefully discuss this through additional questions.

The Chair: Right, and now, with the regular rotation we would move to Mr. Stetski for six minutes, and with the spirit of collaboration we've seen so far, we'll see if he's going to keep going.

Mr. Wayne Stetski: I would love to offer my six minutes to Mr. Lake.

Hon. Mike Lake: Thank you, Mr. Stetski.

I'd like to start by putting three motions on notice, if I could.

I'm going to start with this one:

> That the Committee undertake a study of Clean Growth and Climate Change in Canada: Carbon Pricing, and that the study consist of no less than six meetings with witnesses.

The second notice of motion is this:

> That the Committee undertake a study on the egregious environmental violations of Volkswagen to determine why the Canadian Government has not taken any action on this issue.

For the third notice, I'm hoping maybe we can get unanimous consent to discuss this motion now, but I'll put it on notice and see where we go with that. It is:

> That the Committee invite the Minister of the Environment to appear before the Committee at any time over the next two weeks to answer questions on the Supplementary Estimates (A), 2018-19.

I'll put that on notice and ask for unanimous consent of the committee to discuss and dispose of it now so we can move on.

The Chair: To Mr. Lake's point on the third notice of motion, normally 48 hours' advance notice would need to be given to move to debate on the motion and—

Hon. Mike Lake: I have a point of order, Mr. Chair.

The Chair: Yes.

Hon. Mike Lake: As a very brief explanation, it seemed at the last meeting there was no mechanism to have this discussion and that's why I'm asking for unanimous consent today.

The Chair: Is there unanimous consent to deviate from our established procedures?

I'm not seeing unanimous consent so we'll take the three notices of motion.

Hon. Mike Lake: Okay, with that response from the Liberal members of the committee, I move:

> That,
>
> (a) the Minister of Environment and Climate Change appear before the Committee to discuss the Committee's study of Clean Growth and Climate Change in Canada: Forestry, Agriculture and Waste; and,
>
> (b) in the event the Minister appears before the Committee with regards to Supplementary Estimates (A), 2018-19, the request in (a) be considered to have been fulfilled.

That's the motion I'm putting on the table now.

The Chair: Okay, and because that one relates to the study at hand, we are able to consider it.

Does anybody want to speak to this?

Hon. Mike Lake: I will first, if I can.

● (1610)

The Chair: Okay, we'll start our speakers list.

Mr. Lake.

Hon. Mike Lake: I have a couple of thoughts here. As I mentioned in asking for unanimous consent with the previous one, it struck me that in our process as a committee, we got in a bit of a weird situation in the last meeting because it was presented at the end of the meeting that the minister had been invited for specific times and dates, obviously very limiting in the busyness of a minister's schedule, and had gotten back that she was not available for any of those dates.

In having a conversation around the committee table, it turned out that there was no conversation to be had because there was no mechanism within the rules of committee to allow us to do that. That's concerning to us because clearly, from our side—and I think we'd have agreement from the NDP in this case—it would be important for the minister to appear, and as a responsible environment committee, we should make ourselves available at whatever hour we can to fit the minister's schedule if she's able to appear, and that clearly is a bit of a challenge because we couldn't even have that discussion under the rules of the committee. The way the committee was set up we couldn't even move a motion in that direction and agree as a committee that we would want to have that happen.

We've done a little research, of course, and taken a look at supplementary estimates in this committee previously, and in almost every year since 2008, the minister has appeared for the supplementary estimates. There are very few exceptions in that time frame, so it stands to reason that particularly in this budget, with the numbers we're talking about being asked for in supplementary estimates going well above the planned expenditures of the department, that the minister would appear before this committee.

Mr. Chair, first of all, I'm wondering how many people are on the list to speak.

The Chair: I have two others at this point.

Hon. Mike Lake: Who are they?

The Chair: They are Monsieur Godin and Mr. Aboultaif.

Hon. Mike Lake: Maybe I'll put myself on the list after them. Maybe I'll pass the ball to them to say a few more words and then it will come back to me.

The Chair: Monsieur Godin.

[*Translation*]

Mr. Joël Godin (Portneuf—Jacques-Cartier, CPC): Thank you, Mr. Chair.

I think the motion proposed by my colleague is reasonable. I believe that, as parliamentarians and in situations such as the current one, we must be able to question the Minister of Environment and Climate Change. I can understand that a minister has a very busy schedule. But if we are to do our job as parliamentarians and continue to protect our planet, we must question the person who determines the government's perspective. There were questions at the last meeting on the use of the additional funds.

I would like to stress something that is extremely dear to me. As a parliamentarian, I have a dual mandate to protect the future of my children, both economically and environmentally. These are the two fundamental criteria that will let me be proud, walk with my head held high and say "mission accomplished" when I stop being a member of Parliament. In the meantime, I believe that the least the minister could do is appear before the committee.

At some point, to show good faith, you have to know how to adapt. As I said, I understand that the minister has a very busy schedule. As my colleague said earlier, we are open to the idea of changing our sitting hours to meet our needs. However, for us parliamentarians, it is a need to be able to question the minister.

There is nothing abusive about that. I know there are situations where people exaggerate and partisanship comes into play. Yet this is something very important. Today, people are wondering about the importance of the measures that should be put in place quickly in terms of the environment. However, this is not the same as writing a blank cheque. In light of the answers I heard at the last meeting, the situation is not very reassuring. The government has even decided to vote supply for a bill that has not yet been passed, namely Bill C-69, which amounts to putting the cart before the horse. Let's stop. Let's be responsible. I think we need to ask questions of Canada's leader on the environment.

I'll repeat what my colleague mentioned: we are available, and we are ready to adjust our schedules. I don't know if it's the whiff of an election in the air that is making us a little more partisan. However, we have been successful so far—Liberals, New Democrats and Conservatives—in working together for the benefit of our environment and our planet.

So, I reiterate my colleague's request that we meet with the Minister of Environment by December 3. Our flexibility shows that we aren't being stubborn. We don't need her to make any changes to her schedule. We are ready to adapt in order to get answers to our questions.

● (1615)

[*English*]

The Chair: Mr. Godin, I have given you almost three minutes.

I want to remind anybody on the speaking list that they are to speak to the motion that's before us right now and to stay on that one, which is to have the minister come and speak to this study.

If you have comments on the other motions that have been put on notice, I will be cutting people off on that. I gave you a bit of leeway there, but we need to keep it tight and on the motion before us that relates.... If anybody needs it read again we can do that, but keep your comments focused.

[*Translation*]

Mr. Joël Godin: Thank you, Mr. Chair.

Throughout my speech so far, I believe I have only defended my colleague's motion that the Minister of Environment appear before us to answer our questions on the supplementary estimates for the next quarter. I just want us to make sure—

[*English*]

The Chair: We're now talking about the motion to have the minister come and speak to this study. That debate we can have when those are brought forward, but not at this time.

I'm going to move now to the next speaker.

Hon. Mike Lake: I have a point of order, Mr. Chair.

In the motion as I read it, which you deemed to be in order, there's a clear reference there that if the minister does agree to come to the committee in regard to supplementary estimates, then the previous request to come on this study would have been fulfilled.

I would say as we're discussing the motion, a conversation around supplementary estimates is in order with the motion.

The Chair: I'm saying that it's not. We have experts from three panels. I want to hear from everybody on their points, but I would also like to have us get through the discussion on the motion to have the minister come and speak to this study. The point's been made that you would like her here for the supplementary estimates (A), and we're waiting from the response from her office. That has gone back to them with a request for availability.

If there are reasons why we would like to have the minister come for this study, then that's completely fair. I think the point has been made. We're not going to be richer for knowledge if we start getting into all the reasons why we want her to come on the supplementary estimates.

Mr. Godin.

[*Translation*]

Mr. Joël Godin: Mr. Chair, to demonstrate the good faith of the MPs on this side of the table, I will respect the procedure and what you have said, but I think the motion my colleague has proposed is acceptable.

[*English*]

The Chair: Mr. Aboultaif.

Mr. Ziad Aboultaif: Thank you, Mr. Chair, for welcoming me for the first time on this committee. It seems to be a very peaceful committee that does really reflect on the environment in general. I hope this is what we will truly achieve at the end of the day.

I will speak to support the motion from my colleague. I've never been on this committee, and as I said, this is my first time, but I've been on other committees and I believe that this is a very reasonable request. The reason is that when you have the minister at committee answering questions on such an important topic, I think it does add a lot of value to the discussion as we approach the last year of her mandate.

I think it's very important that we can have that or take this opportunity to shine the light on this important topic right now, and be able to come up with some solutions, and add better results to the discussion and our time around this table.

I do support the motion my colleague put forward. I hope all members around this table from different parties will be able to support it and will put it forward. As I said, I think it's very valuable. I think it carries a lot of weight. I believe it's a reasonable request that somehow we will be happy to see that supported and at least can get everybody's agreement on the importance and the value of it.

Thank you.

● (1620)

The Chair: Mr. Stetski.

Mr. Wayne Stetski: Thank you.

I just want some clarification, Chair. Are we particularly speaking to the forestry, agriculture and waste component, or the larger study of Canada's leadership around climate change?

The Chair: It's specifically to the agriculture, forestry and waste study.

Mr. Wayne Stetski: Then I'm very interested in having the minister come to talk about Canada's leadership in climate change in general, but if that's not what we're dealing with on this motion, I will wait.

The Chair: Okay.

Mr. Lake.

Hon. Mike Lake: I will give a bit of explanation, again, and more explanation as to why this motion's so important.

Take a look at the minister's mandate letter, for example. In her mandate letter, there is fairly clear direction. I will read from it:

> Our platform guides our government. Over the course of our four-year mandate, I expect us to deliver on all of our commitments. It is our collective responsibility to ensure that we fulfill our promises, while living within our fiscal plan.

That's a pretty straightforward argument there from the Prime Minister directly in the mandate letter.

Reading from that plan directly from the Liberal platform in 2015, it says, “We will run modest short-term deficits of less than $10 billion in each of the next two fiscal years to fund historic investments”—

The Chair: Can we get around to the motion that I had given direction on and how it relates to the pan-Canadian framework and the agriculture, waste and forestry, which we're talking about? That would be appreciated.

Hon. Mike Lake: With respect, I've been on committee 13 years. I've served for 13 years. You're allowed some latitude, generally, to get to the point of what you're saying, and there is a point to what I'm saying here.

The Chair: I'm just asking you to make that.

Hon. Mike Lake: Yes, I will.

The Chair: We have excellent testimony and experts before us today.

Hon. Mike Lake: I agree, but in the absence of any mechanism to actually make these points.... We saw that in the last meeting. We have to follow the rules and try to make those points in whatever way we can. I think there are important points to be made here.

I'll read one more sentence from this. I was right in the middle of a sentence, so I'll have to reread the sentence that I was in the middle of:

> We will run modest short-term deficits of less than $10 billion in each of the next two fiscal years to fund historic investments in infrastructure and our middle class.
>
> After the next two fiscal years, the deficit will decline and our investment plan will return Canada to a balanced budget in 2019.

It's a clear promise clearly articulated within the minister's mandate letter. It was interesting that in the last meeting we had officials before the committee talking about the supplementary estimates who couldn't reference any type of conversation, leadership from the minister's office or conversations within the department around any efforts to stay within the budget balance, within the budget program—obviously a real challenge.

The mandate letter goes on to say this, which is where it comes to committee here. This is the Prime Minister writing to his environment minister:

> As Minister, you will be held accountable for our commitment to bring a different style of leadership to government. This will include: close collaboration with your colleagues; meaningful engagement with Opposition Members of Parliament, Parliamentary Committees and the public service....

And it continues. He was directly very expressive about meaningful engagement with opposition members of Parliament and parliamentary committees. It was something that was in the minister's mandate letter.

Here, we have a motion. We now have had multiple motions asking for the minister to come before the committee. We wanted that to happen within the context of the supplementary estimates, but as my NDP colleague suggested, if we can't get her within the supplementary estimates, surely we can within this study on forestry, agriculture and waste.

We will as a committee I'm sure—I'm sure the Liberal members will as well—make ourselves available at any given time to have the minister before us. It is critically important that the minister come before us. You'll notice that at least on this side of the table we've been able to work with two parties, the Conservative Party and the NDP, to find some common ground in terms of our approach on things. We both deem it very important that the minister come before the committee.

When we talked about a previous motion and wanted to have a study on what we deemed the carbon tax, the NDP moved an amendment to refer to the carbon tax as “carbon pricing”, which was something that was clearly designed by the NDP member to build a bridge to the Liberal Party. The Liberals basically voted unanimously to stick with the wording “carbon tax” instead of the wording “carbon pricing” just so they could vote against that motion and vote against that study.

● (1625)

The Chair: Could I ask you again—it's all interesting background—to try to keep the comments tightened around the motion before us? I have other people on the list I'd also like to get to.

Hon. Mike Lake: I appreciate that.

Can you tell me who's on the list?

The Chair: It's Ms. Dzerowicz and Monsieur Godin.

Hon. Mike Lake: I fear that as has happened in the past the Liberal member who is on the list will immediately move to stop the debate, thus blocking the appearance of the minister or even the invitation to the minister to come before committee. That tactic has been used in the past in this committee and that's a bit of a challenge obviously for us in terms of—

Mr. Mike Bossio (Hastings—Lennox and Addington, Lib.): You're the one who used it.

Hon. Mike Lake: Pardon...?

Mr. Mike Bossio: You're the one who used it.

Hon. Mike Lake: We can pass that motion right now unanimously if you want, Mr. Bossio. We can pass that motion unanimously if you want or we could bring it back for discussion. You'll remember that it was done in the spirit of working together.

The Chair: We're way off topic here.

Hon. Mike Lake: I'm sorry. Mr. Bossio engaged in a conversation.

The Chair: I'm asking that the conversation between the members end.

Hon. Mike Lake: Okay, but I'm going to answer the question coming from the Liberal member. The motion was to have the minister appear. We had witnesses who had travelled across the country to be here, and there was a discussion about continuing that conversation, which hasn't happened yet.

In the spirit of continuing that conversation, I imagine that Ms. Dzerowicz, when she gets the floor.... My hope would be that she would add her two cents into the equation and we could continue the conversation, but my fear, of course, is that this conversation is going to be over and we're going to end this meeting without having given the minister a clear invitation that she can come at any point in time to visit this committee.

Why is it so important that we have the minister before the committee to discuss the supplementary estimates?

The Chair: Or the motion on the forestry, agriculture and waste....

Hon. Mike Lake: Or the motion....

Perhaps we can use the opportunity when she comes to discuss forestry, agriculture and waste to also, perhaps, address the supplementary estimates at that time, because it's quite clear that we're running a $20-billion deficit right now, and we have a government that has no idea how to get back to balance.

Here we are, we have a minister who's just added—

The Chair: That's starting to stray into territory that I've asked you not to go into. If we can keep the comments to the motion, specifically related to the study that we're dealing with now—forestry, agriculture and waste—that would be really appreciated.

Hon. Mike Lake: I'm looking for any kind of sign from across the way that we're going to have a meaningful discussion about potentially having the minister here, and not just shut the conversation down.

Mr. Joe Peschisolido (Steveston—Richmond East, Lib.): We can have a meaningful conversation here.

Hon. Mike Lake: Joe, that's fair. The Liberal members who aren't on the list continue to weigh in, so I'll continue to answer the questions if they have them, but the reality is, Joe, that we tried to have that conversation and we weren't able to have that conversation.

The Chair: Mr. Lake, you're now directing conversation to a member. I'm asking you to stay on the point.

This is the third time I've asked that and, as the chair, I do have the right to move on to the next speaker. I'm giving you the floor one last time to try to bring your comments back to the motion that you have in front of us and the parameters that I've set around it. If you're not able to do that, then I will move on to the next member.

Hon. Mike Lake: Mr. Chair, I appreciate that.

I'm going to continue to make the points that I need to make with the opportunity that I have to make them. I fully respect your right as chair to turn off my mike and move to the next speaker whenever you see fit.

I understand that what I'm talking about isn't necessarily on topic with my motion, but given the way the government has driven the agenda of this meeting and blocked reasonable requests by both opposition parties to hold the government to account, to have the opportunity for the minister to come, this is the only option we have.

● (1630)

The Chair: I have to weigh in at this point.

Hon. Mike Lake: I appreciate that you're going to shut my mike off now.

The Chair: No, I'm just going to say that actually the government side hasn't had the mike so they haven't weighed in. They haven't said the things that you've just said, but I am going to move it on to the next member, and we'll see what Ms. Dzerowicz has to say.

Thank you for your comments.

Ms. Dzerowicz, it's over to you.

Hon. Mike Lake: That sounds good.

Ms. Julie Dzerowicz (Davenport, Lib.): Thank you, Mr. Chair.

I move that the debate be now adjourned.

Hon. Mike Lake: Can we get a recorded vote, please?

(Motion agreed to: yeas 5; nays 4)

The Chair: Debate on this one has been adjourned, so now we'll move back to the rounds of questions.

Next up is Ms. Dzerowicz.

Ms. Julie Dzerowicz: How many minutes do I have?

The Chair: You have six minutes.

Ms. Julie Dzerowicz: Thank you.

Welcome. We have nine of you here, so thank you for coming here today. Thank you for your wonderful testimony.

I'm going to start off with just a few definitions, just so that I can make sure I understand things. If we can get through those definitions quickly, then I can get to my questions.

The difference between carbon storage and carbon sequestration is...? Is it the same thing?

Mr. Tony Lemprière: Yes, it is the same thing.

Ms. Julie Dzerowicz: Okay, perfect.

Mr. Parry, you had mentioned that most of our emissions come from biological processes here in Canada. You mentioned three key sources: methane, nitrous oxide and, I think, carbon dioxide.

I know methane comes largely from our cows. From the agriculture perspective, where do the other two come from?

Mr. Matt Parry: Thank you for the question.

Methane is from ruminant digestion and manure. Nitrous oxide is from fertilizers and manure, and carbon dioxide is from soils and on-farm fuel use.

Ms. Julie Dzerowicz: Perfect. Thank you.

I was listening to a presentation by Dominic Barton, the recent former head of McKinsey. When he talked about climate change, he said that what it'll come down to is who gets to eat meat and who gets to drive cars. That's the way he summarized it very quickly.

This might be a bit of an insane question, but I know a number of people in my riding would ask this. As part of our agricultural contribution to reducing emissions, have we looked at, perhaps, eating less meat? Basically, it's the concept of actually moving away from cows and methane and more towards things that don't produce these emissions. Has that been part of any conversation?

Mr. Matt Parry: It's a very good question. I'm relatively new to the department, so I'll check with my colleagues to see to what extent they're familiar with that. Certainly, in my former life at Environment and Climate Change Canada, I know that was a topic that was examined.

Ms. Julie Dzerowicz: Okay, so the answer is no, it hasn't been looked at.

Mr. Matt Parry: I will offer to follow up on that question to see to what extent we've looked at that.

Ms. Julie Dzerowicz: Okay, that's wonderful.

I think you also started talking about water, conserving water. I want to know what role the management of water has in actually reducing our emissions and in this whole pan-Canadian framework.

Mr. Matt Parry: Maybe I'll give just a couple of points of clarification. Some of the programming under the Canadian agricultural partnership programs includes actions not only to reduce greenhouse gas emissions but also to conserve water and protect soil. That said, there are other opportunities. If you use less water in farming practices, there are the reduced costs of moving the water and using energy to transport water. There are opportunities for savings there.

I don't know. Do you perhaps have anything to add on that?

● (1635)

Dr. Javier Gracia-Garza: Actually, John will take it first. Then if there's anything, I can add that after.

Mr. John Fox: We have a relatively small program called the agricultural greenhouse gas program, which is specific to addressing environmental concerns arising from agricultural technologies. It's to develop specific beneficial practices that farmers can adopt on the farm. We tend to look at those practices in four buckets. One is livestock systems, and to your former question—

Ms. Julie Dzerowicz: Would you mind just focusing on the water? That's what I'm interested in.

Mr. John Fox: Yes. There's water cropping, water use and agroforestry, but those tend to be interlinked in terms of how those practices are developed. For example, we may be looking at what kinds of trees we should grow next to runoff in order to stop runoff from fields, related to fertilizer use, for example, in riparian zones. The nitrogen from the fertilizer is a contributor to greenhouse gases. We tend to look at the interaction among water, soil and air in a systems way as opposed to saying, “This has this effect on water. This has this effect on the air. This has this effect on soil.”

Ms. Julie Dzerowicz: Okay. That's perfect.

Dr. Javier Gracia-Garza: I would just add microbes to the list of water, soil and air, because they are components of that system and there are some emissions associated with them.

Ms. Julie Dzerowicz: Okay. That sounds great.

I'll just move over to forestry. Part of the presentation that was made involved bioheat development and an indigenous forestry initiative. Why is that being offered for only indigenous communities and not more broadly?

Ms. Beth MacNeil: It's not. It is being offered more broadly. I have folks in each of our five research centres across the country who work with first nations and Métis, primarily. We are targeting the more vulnerable populations, where we actually can tie it into some socio-economic development of indigenous communities. It happens to be, so far, more impactful, although we just had our first projects announced this fall. It's not entirely scoped to indigenous, but there will be strong benefits.

Ms. Julie Dzerowicz: Okay. I think I'm done. Thank you so much.

The Chair: Thank you.

Mr. Lake, we will go over to you.

Hon. Mike Lake: Thank you.

Thank you to the witnesses for being here today. Sorry about the beginning part. I think that it's critically important that, if this place is going to function, we have to have clear conversations, clear debates about the things that matter to Canadians. When that doesn't happen, we as parties have a few tools at our disposal, very limited tools at our disposal, to try to get to that point. You got to witness a little bit of that.

On to the subject matter here, I want to talk a little about forest fires. It came up in a couple of previous meetings. The Paris Agreement doesn't account for emissions from forest fires, yet in Canada, I don't know if one of the guests can speak to the total emissions in Canada over the last couple of years or three years, and the amount of emissions coming from forest fires in Canada, just to give some context to the rest of the questioning.

Ms. Beth MacNeil: Yes.

Werner, you have those statistics.

Dr. Werner Kurz: The annual emissions from forest fires vary greatly between years. In extreme years the direct emissions from forest fires can be as high as 250 million tonnes of CO2 equivalents. These are just the direct emissions. Forest fires also kill trees, so these trees will decompose in subsequent years and release more carbon dioxide to the atmosphere, but they will also rejuvenate the forest dynamics, allowing new forests to grow back.

If we had a system of constant forest fires, then the area burnt would be offset by the area regrowing and the emissions would be balanced by regrowth, but unfortunately, what we have experienced over recent years is a dramatic increase in the area annually burned, as was said earlier, so that has resulted in increased emissions to the atmosphere.

Hon. Mike Lake: Just for anyone reading the testimony here, what were our total emissions last year, just generally, broadly? I would expect someone would have that number.

● (1640)

Ms. Beth MacNeil: It was 704 million tonnes last year.

Hon. Mike Lake: Is it fair to say that, at 250 million tonnes, you're talking about over a third of Canada's greenhouse gas emissions from forest fires in years where you have that number?

Dr. Werner Kurz: Yes, but as I said, that was an extreme year. There have been a couple like that since greenhouse gas reporting, 1990 to the present.

Having said that, you have to remember that much of the boreal forest across Canada is regrowing following forest fires. Yes, you have the direct emissions, but you also have vast areas of forest that are removing carbon dioxide from the atmosphere.

By looking just at the emissions, you're not getting the full picture. You really have to look at both, the emissions and the removals, because it's a life-cycle process: forests grow, forests die and burn, forests regrow.

Hon. Mike Lake: I'm not an expert, but it seems to me that you wouldn't have those emissions being immediately absorbed in the same year. You're talking about decades down the road, as the forest is regrowing. It kind of balances out over time.

Dr. Werner Kurz: The emissions that occur in one stand in one year, the stand that is burned, are offset by emissions from other stands surrounding that stand that are regrowing. So yes, the stand that burned will take 100 years or whatever to remove the carbon dioxide that was released from the fire, but the forest is characterized by stands of many different ages that are in different stages of their life cycles, and these other forests are removing carbon dioxide from the atmosphere.

What we're doing with our tools is basically calculating the annual balance of emissions and removals of forests that are in different stages of their life, from young forests to middle-age forests to old forests that are all removing carbon. Some of these removals are offset by the emissions associated with fires, insects or harvesting.

Hon. Mike Lake: The emissions that are being removed by the surrounding trees, if those emissions didn't exist.... I'm talking about that intense black. I mean, Alberta was covered in smoke for most of the summer this year. Again, I'm not an expert, but it seems to me that those emissions were not being completely absorbed by the trees around. Otherwise, all you would ever have to do is surround a coal plant with trees all the way around and, presumably, you would absorb all of the emissions from the coal plant.

Dr. Werner Kurz: Actually, if the forests were large enough, they could do that.

The problem is two things. You have to remember that the area annually burned is measured in one to three.... It went from one million hectares to about three million hectares on average at the present. Recall that the forest area of Canada is about 347 million hectares. When 1% of the area burns, 99% of the forests are in various stages of regrowth. I'm ignoring harvesting for a moment here.

We have to understand that the forest fires are affecting a small proportion of the landscape, an increasing proportion and causing important emissions, but a significant part of these emissions is removed by the other 99% of the forest area that did not burn in this year.

Hon. Mike Lake: If you had a strategy, let's say that in that year of 250 million tonnes—or if your year was 100 million tonnes or 150 million tonnes—you had a quick strike capability in terms of putting out forest fires that could limit it to 10 million tonnes or 25 million tonnes of emissions, it seems to me that would have a significant impact on our overall emissions in Canada. Are you saying that's not the case?

Dr. Werner Kurz: No, I didn't say that at all.

I did say that we have large interannual variability in area burned. You gave the example of 25 million tonnes of emissions in a year. In years in which we have only 25 million tonnes of emissions, the forests as a whole, including the anthropogenic and natural disturbance components, would be a carbon sink. More carbon dioxide would be removed from the atmosphere.

We have years with low fires, in which our forests overall are carbon sinks, and we have years with large fires, in which the forests can be a carbon source. Of course, many other factors play into this, such as the impacts of insects and other disturbances like the mountain pine beetle.

● (1645)

Hon. Mike Lake: Thank you very much.

The Chair: I should acknowledge Mr. Cooper and welcome him to the committee.

We'll move over to Mr. Peschisolido for his six minutes.

Mr. Joe Peschisolido: Mr. Chair, thank you very much.

I'd like to thank the witnesses for appearing.

I'd like to begin my questioning by following up a little bit on a line of questioning by Madam Dzerowicz on the distinction between eating cows and eating plant-based protein. If there is a significant reduction in eating cows, what impact would that have on carbon? I'm assuming it would be positive. Has there been any quantitative analysis on what happens if you move from getting protein from cows, pigs and other animals to plant-based proteins?

Dr. Javier Gracia-Garza: I don't have a precise study I can cite to give you specific figures. I think it would be important to determine what the replacement would be and how the production systems of those proteins would be created. Scenarios would have to be developed for something to that effect. There's nothing I can cite for you in terms of scientific reference to that effect.

Mr. John Fox: I have seen some studies that have identified the agricultural sources by types of agricultural practice. We may be able to go back and find you a study that identifies the livestock contribution, for example, in comparison with other cropping methodologies.

Mr. Joe Peschisolido: Okay.

Mr. Gracia-Garza, you mentioned types of production systems. At the agriculture committee, we're looking at the distinction between organic farming and non-organic farming. I can't remember who brought up the whole point about soil, water and fertilizer.

First, is there a difference in these two types of agriculture modes? Second, has there been any study on the impact of an organic system versus what is going on now in the mainstream?

Dr. Javier Gracia-Garza: Again, there's nothing I can give you in terms of figures, per se, when it comes to an organic system versus a traditional or conventional system. I think there clearly are fewer inputs in the case of inorganic fertilizers. Some of the nitrous oxides in other emissions associated with that will be part of this equation.

I would like to bring to your attention one of the comments made by my colleague Mr. Parry. We are launching, as a new initiative within Agriculture and Agri-Food Canada, something that we are calling “living laboratories”. Within these living laboratories, we will be exploring key components. One of the two innovative pieces of what a living laboratory will be includes bringing a much more systematic approach to how all of these differing factors—soil, water, biodiversity, microbial—are interacting within agricultural systems. By looking at this more comprehensive approach, we can develop beneficial management practices that look at the reduction of greenhouse gas emissions, better conservation of soil, the rebuilding of soils that are becoming degraded as a result of erosion or all sorts of issues, as well as water.

Mr. Joe Peschisolido: Will this program be all across the country, or will it just be in Ontario and Quebec, under your bailiwick?

Dr. Javier Gracia-Garza: It would be across the country. We are hoping to be establishing this in, I would say, a stack, not all at once.

As I mentioned, one innovative piece is the different components working as a system, but the second is about working in farm environments and with farmers to develop these beneficial management practices. We want the benefit of learning. Doing the research in a different way will be part of the benefit of learning, so deployment of these living laboratories across the country will be sequential. That's what we envision.

● (1650)

Mr. Joe Peschisolido: That's a good thing.

This is less of a question and more of a statement about what you've just outlined here. Kent Mullinix, head of sustainable agriculture at Kwantlen University in Richmond, is actually doing just that. That's just a point there.

I'd like to follow up with Mr. Lemprière. You started discussing the importance of wood—forests—on the sinks, as you've put it. Can you elaborate a little on that? In B.C., there are a lot of forests and quite a bit of wood.

Mr. Tony Lemprière: As the assistant deputy minister said, there are multiple aspects we need to look at when it comes to forests, the use of wood and contributing to climate change and emission reduction goals. There are things we can do in the forests, such as changing management practices, making efforts to restore or rehabilitate forests after things like the mountain pine beetle infestation or fires, other types of activities in the forests—fertilization and those sorts of things—and some of the things that have come up in previous comments and questions. We can make efforts to try to reduce fires and the risk from fire.

All those things could contribute and are tied in with how we use the wood. When we harvest, that has a big impact on the carbon in the forest, so we can look at what we do with that harvest—the carbon that comes out of the forest and is used in forest products—along the lines of some of the things I mentioned earlier. Of course, we can think about using waste wood for bioenergy, to replace fossil fuels. All those pieces are part of what we need to look at.

It's also part of a systems approach that we take when we think about mitigation and forests, so in any given possible action it's important to look at the impacts in the forest on wood use, bioenergy and so forth. We can look at all those things, and indeed we are expecting that the forest, how we manage it and how we use wood will be contributing to our 2030 emissions reduction target.

Mr. Joe Peschisolido: Thank you.

The Chair: Mr. Aboultaif, you have six minutes.

Mr. Ziad Aboultaif: First of all, thank you for appearing before committee. I have a report here showing the net carbon emissions in Canada's managed forest—all areas—between 1990 and 2016, which is 26 years. That report shows the emissions, and it seems like we had increases in 2005, 2006 and 2007. After that, it seems to be a consistent level. There were some drops from 2008 to 2013, and then since 2015 it's gone down again.

With 2.5 million hectares, it represents only about 1% of the total Canadian forestry as per the report. Can you explain, with 1% only, how much impact that has on emissions and what it means in budgetary terms to deal with that? How can we offset that balance somehow, if we have to deal with it?

Dr. Werner Kurz: Could you just please clarify what the 1% was that you were referring to? Did you mean 1% as the area burned by forest fires?

Mr. Ziad Aboultaif: Yes.

Dr. Werner Kurz: Basically, the question is, what can we do to reduce the emissions from forest fires? Is that correct?

Mr. Ziad Aboultaif: How many resources do we need to do that if we're only dealing with 1% of the total forested area in the country?

Dr. Werner Kurz: Yes, I appreciate that.

First of all, we have to appreciate where these fires occur, because most of these fires and most of the areas burned are caused by lightning, and much of it occurs in remote areas where we do not have the kind of infrastructure that is required to suppress forest fires effectively.

Secondly, if you go to southern California and witness what happened in recent days there, you see that even where you have high population density, road infrastructure, airports and all the fire suppression technology in the world, we're still facing situations where forest fires simply cannot be suppressed because of the intensity of the energy that is being released in these forest fires.

I'm the carbon guy. I'm not the fire expert, but what my fire experts say is that what has happened in recent years is that the conditions in the climate situation have increased the intensity of forest fires to the point that the fire suppression efforts are increasingly overwhelmed. It is, I would argue, not possible to increase the resources to the point that all forest fires can be suppressed. I should emphasize that British Columbia, for example, in the last four years has spent about $1.6 billion in fire suppression efforts. That is just at the provincial level. The numbers across the country are, again, in the range of $700 million or $800 million per year and probably more in some.

The big question, therefore, is this. Do we need to change our strategy as we face climate change impacts to start managing our forests in such a way as to reduce the risk of future fires rather than trying to spend more money on suppressing fires when they occur?

● (1655)

Mr. Ziad Aboultaif: Thank you for the answer. To build on that question, you're recommending not to spend any more resources, but if we—

Dr. Werner Kurz: I did not say that. I said that no matter how much you increase the resources, we will not be able to suppress all fires. That's what I said.

Mr. Ziad Aboultaif: Okay, but you didn't answer my question on the numbers. I can understand you probably don't have that amount, but I would say that, if more resources are needed to suppress more fires—let's put that argument in place—and we were able to achieve that goal somehow through this mechanism, would that give us any credit back on the Paris Agreement commitment?

Ms. Beth MacNeil: Werner, I think I'm going to take this.

Coming out of September's Canadian Council of Forest Ministers meeting—usually that's simply an information exchange session that happens annually with federal, provincial, and territorial ministers—there was a key action that came of it. My deputy minister, along with the deputy minister in British Columbia, were tasked to come up with a suite of priority actions that would be required to start to address the high magnitude and frequency of forest fires in Canada.

Do we have adequate resources? No, we don't. We're working with our federal and provincial partners. We've identified the priorities, and we're working with them to cost those. We're also working with Public Safety Canada on an emergency management strategy.

Mr. Ziad Aboultaif: Just to close on this, then, I'm here sitting and listening to both arguments. Even if we put in more resources, we're not going to make any huge difference beyond the causes of the fires. In the meantime, if we do so, you're still saying that we don't have enough resources and that even our strategy is not good enough to be able to cope with this problem.

Ms. Beth MacNeil: I would say we need more resources, and there are management practices that we can consider with our provincial and territorial colleagues. I can't make the assumption that it will reduce forest fire frequency to zero.

Mr. Ziad Aboultaif: Thank you.

The Chair: Mr. Bossio, we move over to you.

Mr. Mike Bossio: Thank you, Chair.

Thank you, all, so much for being here today and for your patience. We really do appreciate it.

I wanted to delve into this aspect, as well, a little bit. Is it not the case that forests are not considered in our Paris numbers because of the cyclical nature of absorbing and then expending carbon by trees, period? Yes, they do absorb carbon, but when they die, that carbon is then released. Is it not just because of the cyclical nature of our forests that they are not considered right now, as far as meeting our climate targets is concerned?

● (1700)

Ms. Beth MacNeil: Thank you.

Tony, can I let you finish what you started about an hour ago in terms of...?

I think it will answer your question in terms of the net sink and how Canada is going to go forward in the accounting under the international regime.

Mr. Tony Lemprière: Under the Paris Agreement, countries can, and indeed are encouraged to, use their land sectors, including their forests, in achieving their emission reduction targets, and Canada is going to do the same. You're right that forest stands have cycles, but we are looking at the entirety of the managed forest, which I think was said earlier is a large area. It's 226 million hectares. We're looking at the entirety of the managed forest and the impacts of human activity on that. We are planning to include that in working towards the 2030 target.

Right now, or for the latest year for which we have information, which is 2016, the managed forest and harvested wood products together were a sink of I think it was 27 megatonnes. What we need to look at is how we can change management practices, how we can use more wood, how we can use wood for bioenergy, how we can do things like reduce the risk from fire, how all of those types of things can increase carbon sequestration and reduce emissions. It's the impacts of those types of actions that we can then use in working towards the 2030 emission reduction target that we have under the Paris Agreement.

Mr. Mike Bossio: Do you know how much of our forests are harvested on an annual basis right now?

Mr. Tony Lemprière: At this moment, I think in 2017 it's about 750,000 hectares.

Mr. Mike Bossio: How much of the forest right now is infested with the pine beetle or the spruce budworm?

Ms. Beth MacNeil: Werner, do you know the stats?

Dr. Werner Kurz: The cumulative impact of the mountain pine beetle in British Columbia is just over 17 million hectares, but that's not in a single year. This is the whole outbreak cycle since about 2000. The statistics for the defoliators vary, and all of these are cyclical insects. The area affected by insects is far greater than the area affected by either harvest or by fires, but the intensity of the impact of either of these other human or natural disturbances is far greater because insects kill.... The defoliators reduce growth rates and kill some trees through multiple outbreaks or through multiple years of defoliation to a 30% to 50% mortality, whereas a wildfire typically kills 100% or nearly 100% of the trees.

Mr. Mike Bossio: Do we focus any of our efforts today on harvesting those areas that are impacted? How much of our resources today are focused on harvesting those specific areas?

Dr. Werner Kurz: Depending on where you are in the country, a significant fraction of the total harvest is always directed at recovering losses from natural disturbances, fires and insects, but—

Mr. Mike Bossio: You have such a large area.

Dr. Werner Kurz: It is a significant fraction of the total harvest area, but what I said earlier is that the other areas are larger, so we can only capture part of it. The reason for this is that the insects and the fires occur both in the managed and the unmanaged forest, and even within the managed forest, we don't have roads to all of the areas affected by natural disturbances. It is always only a fraction that can be harvested.

I'll leave it at that.

Mr. Mike Bossio: I wanted to feed off from that the importance of the $1.3 billion that is being invested into protected spaces. Could you maybe delve into that as far as not just how climate mitigation is concerned, but the health of the environment itself around sustainability of that environment and the biodiversity that exists when you have a protected space.

● (1705)

Ms. Beth MacNeil: I'll try to tackle that. It's not an easy question, but I have folks and some members of my team here, who are working.... I'm not going to answer the protected-area issue at large, but I do want to bring attention to an area such as B.C., and we provide a lot of expertise to ECCC on socio-economic analysis and economic valuation of our resources, whether they be timber resources or minerals, in support of something like the Species at Risk Act, if you're talking about biodiversity.

You may know that we're looking at the southern mountain caribou, about which Minister McKenna actually issued an imminent threat determination in early May, so we're working with our industry colleagues and with the Province of B.C. There are 10 local population units in B.C. and three in Alberta. There has to be a balance—that's what I would say—in identifying the right areas for biodiversity, how much the quality of those stands would contribute to the pan-Canadian framework on clean growth and climate change, while supporting the well-being of communities. We have 165 communities in Canada that are dependent on forestry.

There is a balance. I'm not answering your question directly, and I don't want to dismiss it, but there are a lot of factors and we take in all of these considerations to make the right decision in the public policy.

Mr. Mike Bossio: Thank you.

The Chair: We're going to go over to Mr. Stetski for three minutes. To give everybody a sense of timing, we'll have time to do a six-minute round for each side after Mr. Stetski's three minutes, so you can figure out who your next speakers are going to be.

Mr. Wayne Stetski: Thank you.

In my former life I was regional manager with the Ministry of Environment for southeastern British Columbia, responsible for provincial parks, fish and wildlife, and ecosystems. In that part of the world, grasslands and restoring grasslands was a major part of what we were doing, so we would cut down a lot of trees. You know, the difference between logging and ecosystem restoration is that we left all the biggest trees and took out all the smaller ones.

I have a couple of questions coming from that. We're still doing it today. The really rich ungulate populations, for example, that we have in my part of the world are due to grasslands more so than forested lands. That, of course, leaves thousands of slash-burning piles lined up around the landscape. Are there any funding incentives to do something with the slash piles other than just burning them on the land? What are those incentives? That is my first question.

John, I see you nodding. Did you want to take that?

Mr. John Fox: It's probably more appropriate for our forestry colleagues, but it's a big problem in agriculture all over.... What do you do with residue off field? We've been working with industry and looking for a whole bunch of different uses—making biopellets, different fuel sources, different ways in which we could leave the residual straw on the field for grazing purposes. In the west, a whole cropping livestock technique around swath grazing has emerged, where rather than clearing the field, you pile it up and let the cattle out on it, and then they can use that as a food source during the winter months.

Yes, it is a big issue. In some cases we're even looking at harvesting it and taking it for further processing, so there may be some value in extracting components from that, which could then be used for different bioproducts as substitutes for petroleum.

Mr. Wayne Stetski: Is there specific funding, though, if somebody wants to set up a bioenergy plant out in our rural ridings?

Mr. John Fox: We do bioproducts, but they do a lot more in the bioenergy field.

Ms. Beth MacNeil: Thanks, and I'm going to turn to Anne-Hélène to give you the names of the two programs and the funds that are available.

I actually had Susan Yurkovich in my office earlier this afternoon, the CEO of the Council of Forest Industries in B.C., and we were talking about the cost of transporting and removing those slash piles from the forests. The truth of the matter is, I think, that first of all there are associated consequences with forest fires, frequency and magnitude of forest fires, but if we actually harvest those residues it can help spur the bioeconomy in bioproducts. There is a value, or they can be turned into an economic value in bioproducts and biofuels.

Anne-Hélène, could you describe the two programs, please?

Ms. Anne-Hélène Mathey (Director, Economic Analysis Division, Canadian Forest Service, Department of Natural Resources): There is one program that is not ours. It's Environment Canada's program, the low-carbon economy fund, which has dedicated significant funds. Our assistant deputy minister mentioned some $200 million—

● (1710)

Mr. Wayne Stetski: Was that the low-carbon economy fund?

Ms. Anne-Hélène Mathey: Yes. The low-carbon economy fund dedicated significant monies to improving management practices when provinces came up with such program requests. In particular, some of these practices involve a better utilization of the forest fibre harvested, leaving a lot less on site. That's about forest practices.

Maybe if you want to add, you can.

Mr. Vincent Ngan: Sure. As you know, the low-carbon economy fund is a $2-billion fund, with the majority being dedicated to supporting territories and provinces, putting forward priority programs. Organics diversion is one area that can be supported. In addition to supporting provinces and territories, there is also a merit-based process called the champion fund that has $500 million, with $450 million of that being dedicated to asking not just provinces and territories, but also private sector and not-for-profit organizations, to put forward their best ideas. We launched that earlier this year. So far we have already received submissions and we're in the process of weighing in and assessing to see which ones actually will receive funding.

Last, but not least, $50 million, which we have not launched, will be set aside for smaller entities, be they indigenous communities, or small and medium-sized companies. This is one area that could benefit for-profit and small entities.

Mr. Wayne Stetski: Is that under the champion fund as well?

Mr. Vincent Ngan: That's correct.

Mr. Wayne Stetski: Thank you.

The Chair: Wayne, we're two minutes over. Do you want to just make this your six-minute round? You can finish off—

Mr. Wayne Stetski: Six plus three is nine, but....

Sure, I'd like to continue, yes.

Ms. Anne-Hélène Mathey: We have another program in the Canadian Forest Service and Natural Resources Canada that aims to spur commercialization of innovations and innovative technologies. It's called the investments in forest industry transformation program. Through this, we finance some projects aimed at.... Earlier we talked about better utilization of the fibre. The projects that IFIT has funded are aimed at converting these residues into something useful, including panels, for instance, and in particular other projects that include bioenergy. Often these residues are the harvest residues that are dirty. They can be used for that.

Mr. Wayne Stetski: That was the investments in forest industry transformation fund.

Ms. Anne-Hélène Mathey: Yes.

The Chair: Thank you.

Now we'll move over to Mr. Scarpaleggia.

Mr. Francis Scarpaleggia (Lac-Saint-Louis, Lib.): Thank you very much, Mr. Chair.

This is a very interesting conversation. I'd like to bring the conversation back to the discussion of water and how water impacts GHG emissions from agriculture or forestry. I forget who discussed it, but there was talk before about how a runoff, which would carry fertilizer, would have an impact on greenhouse gas emissions, if I understood correctly, and that planting trees that are more water absorbent could mitigate that problem.

Could whoever answered that question previously elaborate on that?

Mr. John Fox: I can't elaborate on the science, but I can elaborate on the program. As I was saying, we have a greenhouse gas program that addresses that from an agriculture perspective, from a systems perspective. We'll look at livestock systems, at cropping systems, at water-use efficiency, irrigation, etc., as well as agroforestry, the planting of trees in riparian zones and the impact that would have on....

What we'll end up doing through these studies is, as you've mentioned, looking at specific impacts on a nutrient runoff, but also soil erosion. We'll look at algae blooms and the impacts of nitrates on water systems, as well as soil health, all at the same time.

Mr. Francis Scarpaleggia: Does water carrying nitrates into larger bodies of water have an impact on greenhouse gas emissions?

● (1715)

Mr. John Fox: Nitrates are a contributor to greenhouse gas.

Mr. Francis Scarpaleggia: Given that they're in a water stream, would they be released into the atmosphere? Is this the...? I don't want to get stuck on the science because I'm not a scientist either, but if anyone has any insight, please, I'd like to hear it. Then I'll move on to another topic.

Mr. John Fox: From my understanding—and I'm not a scientist either—it's largely in the production of the nitrates that creates a greenhouse gas, so their use, like the use of carbon-based fuels, is the contributor to the greenhouse gases. How they are used on a farm and the demand for phosphates and nitrates are the contributors to greenhouse gases.

Mr. Francis Scarpaleggia: Okay. Not the runoff, necessarily—

Dr. Javier Gracia-Garza: Sorry, but I have just a point of clarification on that. One of the issues that I think is being studied.... I cannot tell you necessarily the results of those studies right now. With the water content of the soils, its actually the microbial communities that degrade some of the molecules that will actually create some of these emissions. The water content in those soils changes the ability of the microbial community to actually do a sort of chemical decomposition of certain things like fertilizers and probably emissions. Those are part of the correlation. Drainage, irrigation and things, and the management of the water and soils are what is actually related to that.

Mr. Francis Scarpaleggia: I imagine that these are some of things that the agricultural GHG program is looking into. I believe there was a grant made to Macdonald College in my riding.

Dr. Javier Gracia-Garza: [*Inaudible—Editor*]

Mr. Francis Scarpaleggia: Yes, that's why I'm asking.

There's also another organization in my riding. I don't mean to bring it all back to my own constituency, but at FPInnovations they seem to be doing fantastic work in developing new products for the forestry sector. Do any of these new products help with this battle against greenhouse gas emissions, or is it not really relevant to the issue?

Is it more of a commercial product development issue that has no bearing on greenhouse gas emissions, or are some of the things they're doing helping in the area of mitigating greenhouse gas emissions as well?

Ms. Beth MacNeil: What FPInnovations does significantly contributes, I think, to what we're trying to do in the greening of the economy and the shift to the low-carbon economy.

Before I go on to FPInnovations, I would like to say with regard to water conservation that Dr. Tam, the chief public health officer for Canada, in her first report last November, talks about the built environment and the importance of green infrastructure. Actually, if you plant trees, if you have urban forests, this helps reduce the temperatures. If you have more green—living plant material—within a city, it also has a significant impact on water conservation. I wanted to mention that in terms of an urban environment.

FPInnovations, as you probably know, was created in 2006-07 by the amalgamation of three forest research institutes. Without the research that goes on at FPInnovations, we wouldn't have the tall wood buildings, the cross-laminated timber, the mass timber structures and the substitution of wood for steel and concrete.

We want to do more of that. We actually have this technology overseas now. Canada helps support an eco-district in China, and I think we're pushing.... You may know that the federal government is a strong financial contributor through Natural Resources Canada to FPInnovations, and we are pushing them into broadening and diversifying the bioproducts range, such as bioplastics, for instance.

Mr. Francis Scarpaleggia: Thank you.

Is my time over?

The Chair: Yes.

I just have to say that Francis, our national caucus chair, uses a yellow and red card system.

Mr. Francis Scarpaleggia: I'm flattered that you've adopted my mechanism.

Voices: Oh, oh!

Mr. Joe Peschisolido: He uses it freely, much more freely than Mr. Aldag.

Hon. Mike Lake: I thought he was treating this as a soccer match. I thought he was kicking him out.

I want to follow up on the line of questioning that we've had. Over the last several weeks of meetings that we've had, we've heard from witnesses about the many tools at our disposal to try to reach our Paris Agreement targets. I want to zero in on this forestry and land use component.

Beth, I was listening to the nugget of truth that you gave there regarding urban forests and parks and the concept there. For regular Canadians who don't follow this all the time—and really, I want your language to reflect that in answering this question—what is the optimal carbon outcome of absolutely optimizing our land use as a country?

We have a massive amount of land in this country. I'm thinking specifically about forestry and plant life. If you think about decreasing emissions—the forest fire question and whatever other ways we can decrease emissions as that relates to plant life—and increasing absorption of carbon, what would you share as things that Canadians need to know about how to reach that optimal outcome for Canada?

I don't know if Beth wants to start. How about if I just leave it open to anyone who wants to weigh in on that?

● (1720)

Ms. Beth MacNeil: Since we only have three minutes, I don't know if it's—

Hon. Mike Lake: We have six for this one.

Ms. Beth MacNeil: We have six.

Tony and Werner or a combined....

Dr. Werner Kurz: Basically, fundamentally, the first thing to do is to increase the forest area where possible. Canada, unlike many other countries, does not have a significant problem of deforestation—in other words, the conversion of forest to other land uses—but we certainly do have opportunities for afforestation, whereby we take lands that are of marginal agricultural value or have been degraded from forest fires or some other causes and bring them back to act actively as carbon sinks. There are certainly many opportunities to manage our forests better to reduce the losses due to mortality, to go in and thin periodically, remove trees and basically manage forests so they are stronger carbon sinks.

The goal is to remove as much carbon dioxide from the atmosphere as possible. That being said, these forests cannot remove carbon dioxide indefinitely. They will grow older and bigger and become susceptible to insects, etc., so they are removing that carbon from the forest, allowing the next cycle to start again, and then making use of the carbon to the greatest extent possible.

To put it in perspective, we're removing about 180 million tonnes of CO2 equivalent of carbon in wood through the annual harvest. Roughly one quarter of the emissions from all other sectors is the CO2 that is in the wood that we remove from the forest, which was previously removed from the atmosphere. How we use that wood is critically important, and this is where we come back to the discussions we had previously about mass timber buildings and other ways of retaining that carbon in harvested wood products for the longest extent possible and while using these products to substitute for other products like steel, concrete, plastics, etc., that are very emissions-intensive themselves. If we could avoid producing steel or concrete to the extent that is possible and replaceable through wooden buildings, we could store the carbon from the forests in the building and avoid the emissions from steel and concrete.

The last point is that as we do all this, there will be residues and waste products at every stage in the process, from the slash piles that we discussed earlier to the bark and other material that is produced in various production facilities to construction waste and post-consumer waste. All of that material, if it can't be recycled or reused otherwise, can be converted into bioenergy, and in particular there are opportunities for second-generation liquid transportation fuels to help offset the very large emissions in the transportation sector using woody biomass as the raw materials.

This is in very broad strokes an outline of how this could be done, and of course I did not discuss potential implications for biodiversity, the impacts of climate change and some of the other complications.

Hon. Mike Lake: Is there someone else?

Ms. Beth MacNeil: Do you have nothing to add, Tony?

Mr. Tony Lemprière: I think that was quite a complete summary. I think all I have to do is to try to boil it down, if I can, to about 10 words, or maybe a bit more: Create new forests. Manage forests to increase the sink and reduce fire risk. Use wood. Build with wood, and use waste wood for energy. Put it to some purpose.

Hon. Mike Lake: Is there a particular type of plant or tree that absorbs carbon more than others do? If someone's landscaping their yard, is there stuff they can do to have an impact in terms of what they decide to plant?

● (1725)

Dr. Werner Kurz: Fifty per cent of the...sorry.

Mr. Tony Lemprière: You go ahead, Werner.

Dr. Werner Kurz: I can't see you, Tony, so apologies for interfering there.

Fifty per cent of the weight of wood is carbon, so basically it's any plant, any woody plant that grows fast and has a high density in its wood. An oak will have a higher density than a poplar, but it grows more slowly. At the end of the day, it comes down to how much carbon you can accumulate in the wood, in your forests, in your urban forests, in your parklands, and in your shelter belts. We have plenty of opportunities across the country to grow more trees and to remove more carbon dioxide from the atmosphere in the process.

Hon. Mike Lake: Thank you very much. I appreciate it.

The Chair: Wayne, we'll go over to you for the last three minutes. This is the three-minute round now.

Mr. Wayne Stetski: Thank you.

It's very interesting, and I want to continue the discussion a little. I don't want to create issues between the departments, but when I was taking out the trees, I was creating grasslands, native grasslands. In terms of carbon sequestration, an acre of trees—and I know it might depend on the age and the stage of the trees—versus an acre of native grassland, have you looked at which one is actually doing a better job in terms of carbon?

Ms. Beth MacNeil: I'll see if Werner has an answer, but you left out wetlands. I think wetlands are the most significant of all. There are serious consequences for climate change when we drain those wetlands.

Werner, do you have comments?

Dr. Werner Kurz: Yes, in the long term the forest will have the higher carbon accumulation, simply because in grasslands you can accumulate only so much grass biomass. Yes, grasslands also add carbon to soils.

Having said that, in the context of the interior of British Columbia in particular, a mix of grasslands and forest can alter the fire risk. Having vast areas of contiguous forests is contributing in part to the very large fires. Designing a landscape that has more of a matrix of grasslands and forests may help reduce fire risks.

These questions have arisen out of the context of the fires in British Columbia in the last two years. Much research will be directed in the coming years on strategy toward reducing forest fire risks. For example, the Pacific Institute for Climate Solutions has an active program on forest carbon management and opportunities in British Columbia.

Mr. Wayne Stetski: I have the same question for agriculture. If I wanted to be a really conscientious environmental farmer, what crop would I grow to sequester the most carbon? Have you looked at that?

Mr. John Fox: I'll take the first stab and then hand it over.

It wouldn't be the crop. It would be your cropping method. The advent of no-till, better drainage and control of water on the landscape has done more to reduce agriculture's contribution to greenhouse gases than any other single.... As we were saying, it's the system.

Less disturbance of the soil will give you the greatest contribution to agriculture's contribution to the reduction.

Dr. Javier Gracia-Garza: No-till, reduction of summer fallow, cover crops, that will support, I think, a much stabler soil cover that will contribute to that carbon storage, carbon sequestration.

Mr. Wayne Stetski: It's not the what; it's the how.

Dr. Javier Gracia-Garza: Yes. It's the practices.

The Chair: That takes us to the end of the time.

As always, I wanted to thank our Environment Canada officials for coming. We never get to see Natural Resources Canada and Agriculture and Agri-Food Canada. It's been a real pleasure to have the other departments here with us today.

I know we had some wonderful information that will definitely be able to enrich the study we're currently doing.

Thank you all for being here. With that, the meeting is adjourned.