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Chair

Mr. Harold Albrecht

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● (1530)

[*English*]

The Chair (Mr. Harold Albrecht (Kitchener—Conestoga, CPC)): I'd like to call meeting number 18 of the Standing Committee on Environment and Sustainable Development to order.

We are pleased to have four witnesses with us today. We have from McMaster University, Patricia Chow-Fraser. Pat, welcome. From the University of Waterloo, we have Dr. William Taylor. Welcome. From Forum for Leadership on Water, we have Mr. James Bruce. From the St. Lawrence River Institute of Environmental Sciences, we have Mr. Jeff Ridal.

There have been some negotiations among the witnesses in terms of who will go first because of PowerPoint presentations, and so on.

We're going to begin with Mr. James Bruce from the Forum for Leadership on Water, for the first 10 minutes.

Mr. Bruce, welcome.

Dr. James Bruce (Representative, Forum for Leadership on Water): Thank you, sir.

I guess I won the prize of going first because I'm the oldest. I'll tell you what that led me to think about in the Great Lakes.

My short talk is called “The Rise and Fall, and Rise Again, of Pollution of the Great Lakes”.

When I worked at the Canada Centre for Inland Waters on the Burlington side of Hamilton harbour, we were very excited when the Canada-U.S. Great Lakes Water Quality Agreement of 1972 was signed. The scope was broad and it was based in large part on our scientific efforts. The need for a major cleanup was obvious, and the two countries, Canada and the U.S.A., Ontario, and eight states made clear commitments to pollution control programs in the agreement and in the related Canada-Ontario agreement.

Two main problems had been identified. The first was over-enrichment by the nutrient phosphorus, causing major algal blooms, which subsequently resulted in dead areas at the bottom of Lake Erie, and nearshore problems in practically all the lakes, but probably not Lake Superior. The second problem was a pervasive plague of toxic chemicals contaminating fish, water, and sediment. These problems were tackled vigorously by building sewage treatment plants for all municipalities and industries, and regulating phosphorus in detergents and some toxics, such as PCBs and the pesticide DDT.

This effort had wonderful effects, and by the late 1980s the main body of the lakes was pronounced healthy again. But after that, in both countries the governments relaxed a bit, and reduced both staff and attention to comprehensive science and monitoring. They considered, and many other people did, too, that the job was completed and well done.

Unfortunately, along with the inattention and staff reduction came a serious backsliding over the past two decades in the condition of the lakes. Algal blooms on Lake Erie, especially blue-green algae producing toxic cyanobacteria, are now seen as worse than before the big cleanup that began in 1972.

How did this occur? Well, the International Joint Commission has determined in its report this year on Lake Erie that more diffuse sources of pollution rather than the point sources from before are mainly to blame; that is, more often there are large quantities of phosphorus in runoff from urban and suburban areas and farmlands.

Some of this increase is due to changes on the ground. These include bigger sprawling suburbs with fertilized lawns and many pets, and more intensive agriculture using bioavailable fertilizer for things like the corn-soybean rotations that are common now.

Such changes leave more phosphorus on the ground to be dissolved in the runoff and loss of the protective coastal wetlands allows more rapid discharge to the lakes.

The contribution of the changing climate has also been critical. On the U.S. side of the basin, heavy rain events that produce runoff have increased in frequency by 27% since the 1960s. In a study I did recently for the Grand River Conservation Authority in Ontario, which also discharges to Lake Erie, it was found that the annual number of surface runoff events has increased 18% from the 1970s due to more frequent heavy rains and winter snowmelt periods.

Intense precipitation events increase in a warming climate, and the theory shows it to be by 7% per degree Celsius of temperature increase in the atmosphere.

This committee has already heard—I've seen the testimony—from representatives of Toronto and Hamilton about the impacts these heavier rains are having on polluted runoff and floods from their territories.

● (1535)

One of the consequences of this combination of changing land use and changing climate is that much larger quantities of the nutrient phosphorus is carried in the runoff waters, and much more of that phosphorus is of the dissolved bioavailable type.This is a double whammy, both more large flow events and higher concentrations of dissolved reactive phosphorus in those flows.

When these polluted flows reach the warming waters of the Great Lakes, large algal blooms are produced. An example on Lake Erie is on the cover of the 2014 International Joint Commission report, where you see a boat trying to plow through a huge algal bloom. I didn't bring copies of this because I was told by IJC that they had sent copies to all members of the committee.

This re-eutrophication, which is what the process is called, is also beginning to be felt on the shores of Lake Ontario, Lake Huron, and perhaps Georgian Bay as well. The report of the IJC documents the preventive actions that must be taken to reduce phosphorus sources on farmland and in urban areas from ending up in the lakes, and I would commend to you the proposals they have.

In addition, a new era of toxic chemical pollution has also been documented. For highly toxic mercury, after reductions from 1970 to 2005, we now see concentrations on the rise again in some fish and fish-eating birds, such as loons. Coal-fired electricity generating plants in the U.S.A. continue to be a major airborne source of mercury to the Great Lakes, although Ontario has thankfully reduced its number of coal-burning power plants.

The good news is that serious health and ecosystem threats from DDT and from PCBs have decreased as a result of regulations, as shown by analyses of herring gull eggs at Burlington in a program that began in 1972.

But there are a host of new contaminants, not removed at conventional sewage treatment plants, finding their way to the lakes. These include pharmaceuticals, dumped or excreted. There are small but growing concentrations of anti-inflammatory drugs in Lake Erie's open water, far from shore. Antidepressants are observed in Lake Ontario and antibiotics down the St. Lawrence River. Endocrine-disrupting substances are found in Lake Huron.

The gender composition of a community near Sarnia, Ontario is changing, with only half as many boys as girls being born. We've seen similar kinds of changes in fish communities—more females and fewer males. Toxic flame retardants are on the increase.

But on a very positive note, recent research has shown that ozonization, or using ozone, in water and waste water treatment could remove many of these newer pollutants and help clean up our waters.

In summary, our generation, through our governments, holds in trust these vital waters for all to use and for future generations. But if we want the Great Lakes-St. Lawrence system to be healthy, fishable, drinkable, and swimmable, we must renew our commitments. This means an increased commitment to monitoring and science, and a commitment to undertake control measures based on scientific findings. We owe this to ourselves, to our grandchildren, and to their children.

My colleagues will tell you some of the ways we can move forward.

Thank you.

● (1540)

The Chair: Thank you very much, Mr. Bruce. And thank you for staying well within your 10-minute allotment. I want to encourage all our witnesses to follow your great example in that regard.

We'll move now to Dr. William Taylor, from the University of Waterloo.

Dr. Taylor, welcome.

Dr. William Taylor (Professor Emeritus, Biology, University of Waterloo): Thank you.

I'm going to start with a list of issues, not because I'm going to cover them all, but rather because I want to emphasize that most of the Great Lakes issues we're concerned about are related, both in terms of their ultimate causes and also in terms of possible management solutions. The problems are not independent.

As Dr. Bruce started out saying that the Great Lakes Water Quality Agreement in 1972 set targets for the nutrient concentrations in the Great Lakes to remediate the effects of eutrophication. To achieve those targets, they worked out loadings with models whose thrust the figure 2 graph illustrates, to achieve those concentrations. Loadings were adopted, and management actions were put in place to achieve those loadings.

What happened was that at the same time the Great Lakes were suffering from eutrophication there was a great excess of small fish. Some of you who are my age and who grew up in the Toronto area might remember that they washed up on the shoreline in massive amounts in the spring and were cleared by bulldozers into dump trucks, there were so many of them. But with an aggressive stocking campaign of exotic fishes from the Pacific and with control of the sea lamprey, which devastated the population of the native lake trout, those small fish were brought under control, and instead we had a valuable recreational fishery in its place. That is a pretty good success story.

I threw in the next slide to make the point that when phosphorus goes into a lake, it does feed algae—it is first assimilated by algae and bacteria—but it also moves up the food web and nourishes a whole chain of organisms, from those algae through invertebrates and ultimately to the large fish that we find valuable and want to preserve.

A problem with too much algae can arise because there are too many nutrients, and that's commonly the case; but it also can arise if the flow of nutrients up the food web isn't happening properly and efficiently, so that it's accumulating where we don't want it, either in algae, in the water, or on the shoreline. There is a food web aspect to this problem that we need to keep in mind.

Also keep in mind that when we measure phosphorus in the water, we're not measuring all of the phosphorus in the system. We're only measuring in a water sample the small organisms at the base of the food web, whereas just as much phosphorus can in fact be in the larger organisms that we're not including in our measurements. When we say total phosphorus, we really should be saying total phosphorus in the small organisms and not the total amount of phosphorus that's out there.

To return to the management actions that were undertaken, which Dr. Bruce already mentioned, targets for P loading were achieved. I've shown some data on my sixth slide for several of the lakes. The loadings fell as phosphates in detergents were banned and sewage treatment plants were improved. All the lakes met their target loadings, or in fact loadings became lower than the target amount set.

I've chosen Lake Ontario as an example on the next slide, because those preceding are pretty small to look at. The phosphate concentration through time fell, again below the targets that we thought would be necessary to achieve good water quality in the lakes.

What's interesting about this slide is that it shows the trend through time. The circles are all the actual data points of phosphorus in the lake year by year. The black line is the line predicted by the model that was used to set the loadings.

You can see that it over-predicts in recent years. In fact, the model has to be altered to make it fit the data now. That's the blue line. It reflects that the food web and the fate of phosphorus in the lakes has changed since the model was developed. The lakes have changed. It's very obvious when you look at the fish community that this has changed, but the important point is that the lakes are changing, and phosphorus no longer behaves as it did when we set out to manage it.

As we've heard, we have a resurgence of problems in the near shore. These are extreme pictures that I've chosen in the next three slides, but these problems are widespread around the Great Lakes.

● (1545)

The first picture shows the northern shore of Lake Erie in the eastern part, in Ontario, and a massive fouling event with shoreline algae. Clearly you don't want your cottage there. The next shows the infamous algal bloom of 2011 that started in the western basin of Lake Erie and gradually spread and covered a good part of the lake.

Despite achieving our targets for loading and concentration we see a resurgence of these problems. It is very distressing.

One of the hypotheses that is in the literature as to what has changed in the lake concerns invasive species, the zebra and quagga mussels that came from Europe.

In the following picture you can see the bottom of the lake in a shallow area of Lake Ontario. It is covered with these mussels, and this fouling algae, Cladophora, is growing on the mussels in a high-nutrient environment that is created by the excretion of the mussels.

This nearshore shunt hypothesis suggests that the phosphorus is coming into the lake and, instead of distributing over the lake, is being held in the nearshore zone where it is feeding this food web composed of organisms new to the lakes.

We're also pretty sure that non-point source pollution is part of the problem. You have been introduced to this already. The next slide is an illustration from a recent paper on this problem. This shows the southern shore of Lake Ontario between Hamilton and Niagara Falls, illustrating that along the shoreline in areas that are being developed there are small tributaries and other outlets producing high concentrations of algae right against the shore, while the offshore waters are still clean and clear. Nonetheless, right at the shoreline where these small storm sewers and small streams flow in, we see high levels of algae. It's a local problem, but certainly important to the people who live there.

The next slide shows the algal blooms in western Lake Erie for the different years, relating the intensity of the algal bloom, the cyanobacterial index or CI, to the spring loading of phosphorus. You can see there is good evidence in the intensity of the summer algal bloom and that it is directly related to the amount of phosphorus that comes in between March and June.

In particular, that massive 2011 bloom occurred when there was a thunderstorm in June which took a lot of phosphorus off the land at a time before the crops had really started to grow and assimilate that phosphorus, or were dense enough to hold back the soil. Those extreme rain events are becoming more frequent.

There are management options, as the next slide shows, to decrease phosphorus loading into the lakes. We could ban phosphorus from dishwashing detergent and lawn fertilizer and we could continue to improve sewage treatment plants. For non-point sources, we could regulate fertilizer application by farmers or we could push the implementation of best management practices or even more radically, retire farmland. There are management options, if we're confident that reducing phosphorus loading is the right thing.

What about the fishery? The graphs on the next slide show what's going on in Lake Huron. Lake Huron has very low levels of nutrients in the offshore, lower levels than we intended to create. The top graph shows the forage fishes, and they are almost gone. The salmon are getting few and skinny. The number of species of fish that are caught in the survey trials has dropped remarkably as well. We are losing biodiversity, because even though there is a fouling issue at the near shore, there is not much in the way of nutrients in the offshore waters.

We're left with what to do. If the changes in the distribution of phosphorus are due to mussels, we don't really have a management strategy that could deal with the mussels, so it's not clear what we might do there. We could legislate or somehow reduce phosphorus loadings even further, but we are interfering with farmers making a living and with what consumers want to purchase and do with their homes. There is room to question whether these are really no regrets actions that aren't without consequence.

● (1550)

I would submit that in fact what we really need to do is start managing the Great Lakes as ecosystems and manage them more holistically, including managing the fishery as well as the water quality at the same time, and the land use. It really takes a much more complex approach to the problem than just more or less phosphorus than what we are currently allowing in.

Thank you.

The Chair: Thank you very much, Dr. Taylor.

We'll go now to Pat Chow-Fraser of McMaster University.

Dr. Patricia Chow-Fraser (Professor, Director of Life Sciences Program, McMaster University, Department of Biology, As an Individual): I want to first thank the committee for inviting me to come and share my concerns about environmental threats to the integrity of the Great Lakes. I am a professor of biology at McMaster University and I also serve as the director of the life sciences program.

It just occurred to me that we're going down in age here. Everybody knows Jeff is the youngest. I'm not yet emeritus.

Since starting at McMaster University in 1991, I have established the research program on the ecology, conservation, and restoration of Great Lakes coastal wetlands. I have trained 37 graduate students and 100 undergrads to date.

My students and I use a landscape approach—this is more a holistic approach, rather than reductionist—to understand how human activities affect the health of coastal wetlands, and have developed ecological indicators to assess the negative effects of agriculture, recreation, and urbanization. We also study the impact of invasive species and water level fluctuations on wetland health.

Over the past 20 years, we've sampled approximately 300 coastal wetlands throughout the five Great Lakes. Since 2003, however, our lab has focused almost exclusively on the many coastal wetlands of eastern and northern Georgian Bay, wetlands that had not been sampled or assessed before we started there 10 years ago.

It's important that you understand what I mean by a coastal wetland. These are wetlands that occur within two kilometres of the shoreline and are connected to the Great Lakes or a connecting channel by surface water at the 100-year high water mark. They are some of the most productive freshwater ecosystems, supporting extremely high biodiversity, and they include more than 80 species of Great Lakes fishes that spend at least part of their life cycle in them.

There are many free ecosystem services provided by these coastal wetlands. They include filtering water for domestic use, preventing floods, and recharging groundwater. Unfortunately, 75% to 90% of the wetlands that were here 250 years ago have already been lost. They've been infilled or dredged for farmland and for building cities. Many of the remaining wetlands are suffering from increased nutrient and sediment load and are being degraded by the presence of invasive species, such as the common carp, Eurasian milfoil, and the common reed. By regulating water levels of the Great Lakes, we've also interfered with the natural fluctuations that coastal wetlands need to keep themselves healthy.

The first 10 years of my career at McMaster were spent on the restoration of Cootes Paradise marsh. This is in Hamilton; it's part of the Hamilton harbour area of concern. Like other AOCs, Cootes Paradise marsh became degraded over a very long period from decades of untreated sewage being discharged into it. It finally succumbed to the ravages of regulated high water levels and unchecked growth of common carp in the 1970s.

In the 1980s and 1990s, millions were spent in restoration to exclude carp from the marsh and to educate the public about the importance of watershed stewardship, but these efforts have returned only a very small portion of the ecosystem functions. The marsh is still in a degraded state after 20 years of study and management, and sadly, it will continue to require human intervention for the foreseeable future.

What I learned from this experience is that it's far easier and less expensive to spend money up front protecting these coastal wetlands from damage than it is to neglect them and then try to restore only a fraction of their original functions.

Of the 17,000 kilometres of shoreline around the five Laurentian Great Lakes, Lake Huron accounts for 36%. Much of the coastline of Georgian Bay is dotted with islands. In fact, there's an estimate of 30,000 islands. I have never counted them. They are called the Georgian Bay archipelago, which is the largest freshwater archipelago in the world.

With such a long coastline, it's not surprising that Georgian Bay also contains disproportionately large amounts of coastal wetlands. Our research documented that cumulatively, Georgian Bay has more coastal wetland area than any other Great Lake, more than 17,000 hectares, compared with only 12,000 hectares in each of Lake Erie or Lake Ontario.

● (1555)

What is even more unique in the context of the Great Lakes is that most of these coastal marshes, the portion of the wetland that occurs below the shoreline, is still in excellent condition. Using a suite of ecosystem indicators that we have developed, we have found that more than 50% of the marshes in lakes Michigan, Erie, and Ontario are currently designated as degraded, while more than 70% of the marshes in Georgian Bay and Lake Superior are designated excellent and unimpacted. The highest proportion of very good and excellent quality wetlands and the least number of degraded wetlands exist in Georgian Bay.

Our work in Georgian Bay has shown that these marshes provide very high-quality reproductive and foraging habitat for fish and wildlife, including species at risk, such as the Blanding's turtle. These coastal wetlands are typically low nutrient, because the catchments are on the Precambrian Shield and they have minimal human disturbance. Their hydrology and the water chemistry are also heavily influenced by their connection to Georgian Bay through the surface water. All of the wetlands that are hydrologically connected with Georgian Bay exhibit fluctuations in water levels, seiches, that vary by 50 centimetres over a day, or by more than a metre between years.

These hydrologic connections play a critical role in maintaining aquatic biodiversity. They prevent monocultures of emergent and floating vegetation from forming. They facilitate frequent exchange of chemical constituents between wetlands and Georgian Bay and allow daily and seasonal migration of fish, such as northern pike and muskellunge, in and out of wetlands.

Although the coastal wetlands of Georgian Bay are still among the least human disturbed, the sustained drop in water level of close to a metre over the last 15 years, the expansion of road networks and increases in cottage and residential development, and the invasion by non-native species such as the zebra and quagga mussels, the round goby, and the common reed are threatening the integrity of these sensitive ecosystems.

I would like to spend a little time now to describe each of these threats.

The Chair: Let me just interrupt for two seconds, Madam Chow-Fraser. I notice that you have about eight pages and you have 10 minutes. We're getting close to that time, so I would like you to prioritize whatever you want.

I don't want to rush you, but just inform you.

Dr. Patricia Chow-Fraser: All right. I'm going to talk about the water levels.

The water levels in Lake Michigan have fluctuated in approximately 30-year cycles over the past century. They range between 175 and 177 metres, but with a long-term mean of about 176 metres, above sea level.

One of the many consequences of global climate change is there are lower than normal water levels in the Great Lakes, and we are seeing this now. For lakes Huron and Michigan, which are essentially two lobes of the same lake, water levels have been at or below the long-term average since 1999. The mean water level between 1999 to 2013 is 176 metres, which is an average reduction of 53 centimetres below the long-term mean. No other of the Great Lakes is associated with as large or as long a reduction.

There are many consequences of this, but the sustained low water levels have had immediate and devastating effects on the quantity and the quality of the fish habitat in coastal wetlands. Some of these negative effects have included up to 24% loss in breeding and nursery habitat, because they are no longer accessible to migratory fish. There is deterioration in the habitat structure related to disappearance of some of the submergent vegetation in the deeper water and a reduction in the species richness of fish and plant communities. If water levels were to drop to 174 metres, which is predicted by the global circulation models, access to another 50% of the wetlands now extant will be lost.

Even if wetlands don't dry up, we are also concerned about the thermal quality of these wetlands. We have monitored the water temperatures in some of these embayments and have found that the temperature of the water that is used by pike is approaching 27.5°C, which is the point at which the fish stop feeding. We know when they don't feed, they're not growing and they start to die.

There is very little information on how water temperature in these nearshore habitats is changing. There is not a single monitoring system in the whole of eastern and northern Georgian Bay that is now being monitored by government. This highlights the need for more targeted research to understand the threat of warming temperatures and low water levels on the health of nearshore embayments.

I'm going to skip now to talk very briefly about our seeing the same sort of problems that Dr. Taylor was talking about with regard to the nearshore algal blooms in Georgian Bay. This is a big problem, because these are the kinds of things we expected to see in the lower lakes but never expected to see in Georgian Bay.

We're now seeing algal blooms in some of these embayments, and anoxia developing below eight metres from the middle of June until the end of September. All of these are happening because, we think, of association with the low water levels. But there's also increased development, and there are aging septic structures that are also contributing nutrients. None of these is being regulated in such a way that we can actually know what exactly is happening.

A lot of this is really a plea for you to make an effort to establish some monitoring specific to the Georgian Bay context, because it's very clear that you cannot just extrapolate information from Lake Erie, a system that is very shallow and which has a lot of people living in it, to something that is on the Precambrian Shield and that has a very low nutrient concentration.

I want to finish off by telling you that almost all of the work I have done in the last 10 years has not been funded by government agencies. It has been funded by small charitable organizations and private foundations. I think there is a bigger role that governments should be playing in making sure that some of these things are actually monitored and carried through over the next 20 years.

Thank you.

● (1600)

The Chair: Thank you very much, Ms. Chow-Fraser.

We'll move now to Dr. Ridal for a 10-minute presentation, please.

[*Translation*]

Dr. Jeff Ridal (Executive Director, St. Lawrence River Institute of Environmental Sciences): Thank you, Mr. Chair.

I am very pleased to be here today.

[*English*]

Dr. Chow-Fraser mentioned the Great Lakes areas of concern program, which has been around for some time. It's really a flagship program in the Great Lakes basin. There were 43 AOCs originally identified by the International Joint Commission in 1985 as being under intense environmental pressures, 12 of which are in Canada, plus five that are binational AOCs. Currently, there are three delisted and two in areas of recovery in Canada, so there has been progress.

What I'm going to speak about today are two of the areas of concern, the ones about which I have the most specific first-hand knowledge.

The St. Lawrence and Bay of Quinte areas of concern, like most AOCs, have a long history of industrial, urban, and rural discharges, as well as human interventions, resulting in numerous impacts, as shown in the slide, and resulting ultimately in the loss of beneficial uses, which are also known as beneficial use impairments. To remediate and restore those areas, remedial action plans were evolved and put in place using an ecosystem approach, with the aim of improving conditions so that they were equivalent to or better than the non-AOCs across the basin. In order for us to realize that we had reached that stage, delisting targets were set, which were the measures in place to establish whether or not the specific beneficial use had been restored.

Since that time, this program has been rolled out in three phases. The first phase was to identify together with community consultation the key environmental issues for that area of concern. The second phase was to identify the remedial actions that were required. Since that time, these have been under way. The last step in this process is to provide a status assessment with a delisting recommendation.

The geographic areas of the two AOCs I referred to, the Bay of Quinte AOC and the St. Lawrence AOC, are shown in this slide. The Bay of Quinte is a very important inlet to eastern Lake Ontario in the Belleville area. For one thing, it is one of the most important fish habitat areas for the entire lake. As well, among many other things, it hosts a very important recreational fishery. It's all within Canada.

On the other hand, the St. Lawrence AOC was one of the binational AOCs, meaning that it's shared between the U.S. and Canada. It's in the Cornwall area in the St. Lawrence River not too far from here. It involves Canada, the U.S., Ontario, New York, Quebec, and the Mohawks of Akwesasne. I should point out that the Bay of Quinte also involves the Mohawks of the Bay of Quinte.

Once the remedial action plans were developed, each of these areas of concern developed restoration councils, which involved a number of federal and provincial agencies, but also involved members of the community from the first nations, industry, municipalities, conservation authorities, non-profits, and other members of the public.

In fact, the St. Lawrence River Institute, where I work, is really a child of this process. It's a little unique, so I want to take a few seconds to describe it. It resulted from the public involvement process within the first stages of the St. Lawrence AOC and reflects the partnership of the local municipalities, the Mohawks of Akwesasne, and leading citizens. It was incorporated as an NGO in 1994. We built our own facility there on the campus of a local college, with the land provided for free, but really with local funding. There was no provincial or federal support to build this facility, so there's very much a sense of pride locally. We currently have a core staff of 14, with scientists, technicians, and educators.

What do we do? We provide contributions for local science. This is what it was initially designed for: to provide expertise for the local scientists in an area of concern like Cornwall, which of course has a blue-collar background. Research and university partnerships have been key, as well as education and public engagement. The experience gained from working so closely with the AOC process in Cornwall has been passed on to other AOCs, particularly the Bay of Quinte's.

● (1605)

I'll highlight the types of projects that have been put under way through this area of concern and remedial action plan process. Obviously, we have abatement of industrial and municipal discharges, including sewage treatment plant upgrades, retrofits to stormwater facilities, and tracking down.... Once you turn off the big taps, you have to turn off many smaller ones, so there's the fugitive source track-down in terms of industrial contaminants and brown-field sites, as examples. We have habitat restoration and long-term plans such as municipal pollution plans.

All of this leads to improving water quality, and it has led to water quality improvement. In the graphic shown here, you can see the improvement in bacteria levels from where they were in the 1980s, when they numbered over thousands of colonies per 100 millilitres, to down below 100 after these actions have been taking place. The water quality criteria are shown in red.

Each of these areas, Bay of Quinte and the St. Lawrence River, have large agricultural areas, so it's very important to have rural projects such as erosion control, septic system upgrades and inspections, fencing projects, farm manure containment, and many of these other best management practices that are required to deal with these non-point source issues.

Also important in both of these AOCs has been public engagement, engaging the public in the process. For example, the landowners who were involved in these BMP implementations are volunteers. We have public consultation and other mechanisms, and even children's water festivals that happen both at the St. Lawrence AOC, with over 2,000 students being educated each year on these issues, and at the Bay of Quinte. For the last 21 years, our river institute has hosted an annual symposium to talk about Great Lakes water quality and St. Lawrence water quality.

These programs are very, very important, and their progress is an important indicator of Great Lakes recovery and of government commitment. They often involve big-ticket items that require partnerships at all levels. The progress has been slow, as I think most people would consider it, but there's a number of very good reasons for that, one of which is that science is not always clear-cut. We always think of science being black and white, but it's not always.

There have been game-changers that we've talked about already in terms of the zebra mussels and other invasive species, human interventions, development pressures, clearing for crops, and the obscuring effect of climate change. We've had to go back to the drawing board a number of times and reassess the initial delisting targets to see whether they still make sense.

Also, really, you have slow environmental recovery. I have a couple of examples of how that's occurring. I think there's some really interesting information here.

Mercury has been a key issue, with mercury contamination of sediments and in fish in the St. Lawrence area of concern. You can see in the graphic that there has been a gradual improvement over time in sediment mercury, but it has taken over 30 years to see that improvement. As you can see, the red levels, those are the highest levels, have declined down into the blues and the yellows. You still have high levels at Cornwall, so we have a sediment management strategy there to deal with that.

The next slide shows another example. It's the slow decline of contaminants in fish. Here you can see mercury concentrations before the AOC was involved. Afterwards, as you can see, there's a slow decline, but as for the levels now, many of these fish are still above the consumption guideline, which is shown in red here. It's the same sort of story in the Bay of Quinte, where you have PCBs that have declined quite dramatically. They're now tapering off at or near the consumption guideline limit. Continued monitoring, track-down and abatement of fugitive sources are required on this issue.

You've heard a lot about eutrophication or undesirable algae. Nutrient inputs are a very big problem for the Bay of Quinte and the nearshore of the St. Lawrence River. Our graphic shows the inputs at high levels from the Raisin River tributary. Actually, the main body of the St. Lawrence pushes those inputs into the nearshore area, so you still have high levels downstream. Ongoing implementation of these best management practices on agricultural and urban lands, and long-term phosphorus control programs...for example, the Lake Simcoe strategy may be a possible model in the Bay of Quinte.

● (1610)

To give you a little bit on progress, the delisting progress is occurring, slowly. In fact, the St. Lawrence River at Cornwall AOC status has been submitted. I should have mentioned earlier that at Cornwall, because it was a binational AOC, we actually had two separate plans, on the Canadian side with the Cornwall AOC, and then on the American side, because the processes and the problems were very different. You actually have two concurrent remedial action plans under way

The Bay of Quinte AOC is a little bit behind where the St. Lawrence is, but five of eleven impairments are under consideration for redesignation. It needs more science, more action, but the target is to complete those by 2017. Delisting would be another few years down the line, if possible.

The last thing I'd like to point to is another issue to recognize, namely, once you face delisting, what happens after that? There are continued pressures on the environment. There's a need for long-term monitoring and assessment in response to emerging issues. There is certainly a concern, and we hear it in Cornwall, that delisting will mean loss of funding and loss of public interest in this issue. There's a continued need for engagement and to develop a long-term sustainable framework for our collective efforts in these AOCs.

We have undertaken a number of measures, including facilitated workshops and community meetings, to assess priorities and the scope, goals, partners, and funding mechanisms for the future. From this, these ideas and these models can then be applied to other areas of concern.

Thank you very much.

● (1615)

The Chair: Thank you very much, Mr. Ridal. You've reached the end of your time.

We'll now move to our first round of questions. Each member has seven minutes. I'd like to encourage members to be specific about which witness they want to answer a question unless they want to open it to all four.

We'll start with Mr. Woodworth.

Mr. Stephen Woodworth (Kitchener Centre, CPC): Thank you very much to all of the witnesses today. The combined expertise we have in the room is extremely impressive. Your contributions have been very thorough and reflect a good understanding of the issues.

Being from the riding of Kitchener and therefore a little close geographically to Professor Taylor, I'd like to ask him some questions at the outset.

First of all, are you continuing your research, Professor Taylor? I know you're kind of semi-retired, but are you continuing your research?

Dr. William Taylor: Yes, I still have some projects going. I'm finding it hard to pull away too quickly.

Mr. Stephen Woodworth: Very good.

What is the source of funding for the research you're doing now and the research you've been doing over the years?

Dr. William Taylor: My funding now, and it's been pretty much the same way in the past, is from the Natural Sciences and Engineering Research Council for the more basic research part. I also get funding from the Ontario government through the Canada-Ontario agreement.

Mr. Stephen Woodworth: My understanding of the Canada-Ontario agreement is that the Government of Canada provides money to the Province of Ontario, which then uses it to fund projects such as yours. Is that your understanding?

Dr. William Taylor: Yes.

Mr. Stephen Woodworth: Very good.

Have you had an opportunity to follow the either imminent or just-finished Canada-Ontario agreement on the Great Lakes?

Dr. William Taylor: I've been included in some of the discussions, but I don't know the document in detail.

Mr. Stephen Woodworth: My understanding is that it indeed will contain a focus on nutrient loading and the nearshore problems we've heard about. Is that your understanding also?

Dr. William Taylor: Yes, in that all the funding I've received from them has been in that area.

Mr. Stephen Woodworth: Do you have any connection or involvement with the International Joint Commission, which in the end is kind of driving the progress on the Great Lakes?

Dr. William Taylor: Yes. I was on their science advisory board for approximately six or seven years. I chaired it until recently. Jeff Ridal has taken over that job for me.

Mr. Stephen Woodworth: Do you have any observation on what Canada's current role is on that commission and how strongly we are represented?

Dr. William Taylor: The commission is very carefully binational. Everything is co-chaired by a Canadian and an American. All committees have equal numbers of Canadians and Americans.

We have two new Canadian commissioners. We still have a vacancy; we should have three commissioners. The two new appointments appear to be very energetic and dedicated individuals. Those would be Gordon Walker, who I think you've heard from already, and Benoît Bouchard.

Mr. Stephen Woodworth: We received a map of the areas of concern that were I guess originally designated under the international Great Lakes Water Quality Agreement. There seemed to be quite a majority of them on the U.S. side, very few of which have been delisted.

Professor Taylor, do you have any knowledge of what success Canada has had in getting the U.S. to increase its efforts on its side of the Great Lakes?

Dr. William Taylor: Well, I don't know whether Canada has pressured the United States in that direction, but I know that recently, starting approximately three years ago or something in that timeframe, the Great Lakes has had a Great Lakes restoration initiative with very major funding. A lot of that funding is going towards trying to achieve delisting or to solve the problems for those areas of concern on the U.S. side.

Mr. Stephen Woodworth: I'm told that Environment Canada has, on the Canadian side at least, something called the Great Lakes nutrient initiative. Are you familiar with that, Professor Taylor?

Dr. William Taylor: I know of it, but I don't know a great deal about it.

Mr. Stephen Woodworth: Do any of the other witnesses have some knowledge of Environment Canada's current Great Lakes nutrient initiative that you could describe for us?

Dr. Bruce.

● (1620)

Dr. James Bruce: I understand that it's an attempt, at least in part, to monitor more effectively those washes of nutrients, phosphorus, into the lakes in the runoff events. Up until now we've been monitoring only monthly or weekly, or something like that, and missed the big events that dumped lots of phosphorus into the lakes.

That's one of the objectives of that $16-million program.

Mr. Stephen Woodworth: In other words, would you agree that this is a good direction or initiative?

Dr. James Bruce: It's absolutely essential, sir.

Mr. Stephen Woodworth: Yes. Do you know when it began?

Dr. James Bruce: Late last year.

Mr. Stephen Woodworth: Very good. Thank you.

How much time do I have, Mr. Chair?

The Chair: Two minutes.

Mr. Stephen Woodworth: Excellent.

I'd like to ask a little bit about the areas of concern approach.

Perhaps I'll start with you, Dr. Bruce, because you were around at the beginning of it, as I understand, in 1972.

Has this approach been showing appropriate benefits? Has it been meeting its goals as they were determined so long ago?

Dr. James Bruce: It's a little less than what we had hoped for, but it has done two things. It has helped to improve most of the highly polluted areas around the lakes and it has engaged local citizens, and local municipalities, in a very extensive way, which I think has been very healthy for support of all Great Lakes initiatives.

It has been a pretty successful dodge, even though only three of all of the AOCs have been delisted.

Mr. Stephen Woodworth: As we've heard the evidence, there are concerns obviously about the algal blooms, particularly in western Lake Erie, and today we heard about Georgian Bay and Lake Huron.

Can you tell us, Dr. Bruce, if there are any specific geographic areas of concern that ought to be added to those that have already been identified under the Great Lakes Water Quality Agreement?

The Chair: In fairness to the other committee members, we'll have to let you come back to that question in a possible future round. Thank you.

We'll move now to Madam Freeman.

Ms. Mylène Freeman (Argenteuil—Papineau—Mirabel, NDP): Thank you, Mr. Chair.

Just to start, I'm interested, Professor Taylor, in something you said. I have the notes in front of me.

[*Translation*]

You talk about prohibiting phosphorus in dishwashing detergents and in lawn fertilizers.

[*English*]

You mentioned things like that, things we can do to prevent regular household phosphorus from getting into the system, but then you seemed to step back and say that there were also consequences to that.

I'd actually be interested in knowing why we couldn't do that. What's your take on that?

Dr. William Taylor: I guess my reservation is that we did set loading targets, we met them, and the concentrations fell to where we thought they needed to fall, yet we still have the problems locally. I am uncertain in my own mind to what extent those problems are because of the changing food web in the Great Lakes and the different pathway the phosphorus is following, and to what extent it is because of diffuse pollution that we haven't dealt with yet.

Certainly for western Lake Erie, there's no doubt in anybody's mind that we have to control phosphorus to solve that problem, but for other parts of the Great Lakes, such as Lake Huron, I'm not so sure this would help the problem.

Ms. Mylène Freeman: Is it a question of our not doing enough research, or not doing enough monitoring, or is it because each situation is so unique?

Dr. William Taylor: Yes. The lakes are unique, and even the drainage basins are unique.

For example, for the non-point sources, let's take the basin of a river with maybe hundreds of farms in it. Some of those farms could change their practices and it would have almost no effect.

Other farms on tributaries near the mouth should be targeted for best management practices, but how do you do that? That's obviously highly unfair to the farmer you target. He's competing with his neighbours. You hear from farmers in Ohio who ask how they can compete with the folks of Indiana who don't have to do this. You are affecting people's livelihoods.

These aren't actions without consequences for others, although as a user of the lake, I would say, sure, cut the phosphorus back. But that's for politicians to decide and to weigh the pros and cons and make those value judgments.

● (1625)

Ms. Mylène Freeman: That's interesting. I'm unclear on what direction you would send us as a committee, as federal legislators.

Dr. William Taylor: I would try to break down some of the silos.

I think the fisheries should be managed not only as fisheries, but to improve the quality of the water. Farming policy should include not only the economic value of the produce, but also its impact on the lakes.

The lakes, and the Great Lakes basin, really, need to be managed as an ecosystem with all of these things taken holistically into consideration. We shouldn't be managing the fishery only for its economic value and then trying to fix up the water quality in the lakes only by regulating the amount of phosphorus. To me, it doesn't make sense, and it's not likely to be successful.

Ms. Mylène Freeman: That brings me to my next general question, which I think I'm going to open up to all the witnesses to answer.

We hear a lot about protecting and prevention being at a much lower economic cost, and also being a lesser burden, than having to clean up afterwards. Is there any way you can estimate the impact of not protecting our wetlands, of not preventing these kinds of situations from arising, and of strategies at getting there, of the direction we should be going in?

There are so many different things going on and everything is so interconnected. It seems like an overwhelming task and an overwhelming question to ask, but if you could....

Dr. Patricia Chow-Fraser: To give you an example, it cost $4 million to build the structure to exclude carp from the marsh. That was in 1990 dollars. It costs annually still for us to take carp out of there and put good fish back in and that kind of activity.

If you asked the people now if they had known in 1990 that this might happen to the marsh, when it was actually in really good health, and if they would have kept on pumping raw sewage into it, they would say no. They would say that if they had known what it would be 60 years from then, they would definitely not have done it. It's not even that we could return it back to the way it was. It still has only 15% of what it used to have.

Ms. Mylène Freeman: Would other witnesses would like to add something?

Dr. Jeff Ridal: My only feedback to you is that certainly there are people who study the cost of a loss of beneficial uses. I don't have the numbers off the top of my head; that's not what I do. We know, for example, that for invasive species, there are really billions of dollars' worth of impacts.

I would say that it's a sort of plea. I know that's the evidence you folks need in order to make those.... There's a plea for us to see more people actually involved and actually doing those cost estimates. Sometimes you say, well, what is the value of a wetland? What is the value of being able to swim at a beach?

We can do that; I have done some work at beaches and that sort of thing. It's amazing how it adds up. You can throw that into an economic model. For one little beach along the St. Lawrence River, it's a loss of $200,000 a year of economic revenue, so those are significant.

Ms. Mylène Freeman: I guess my question was driving more at what kinds of things we can be doing to be effective, to have it not being a situation of had we known that in 1990. What are the things we can be doing to prevent being in that situation?

The Chair: Bruce.

Dr. James Bruce: On the question of toxic chemicals or chemicals of mutual concern, as they're sometimes called now, I think we need to take the kind of approach you suggested, a more preventive approach. I think our approach now is mostly to assume that all chemicals in the environment are benign until proven otherwise, rather than having some kind of rigorous review to ensure that nothing of a seriously damaging nature gets into our waters.

● (1630)

The Chair: Excuse me, Bruce, but we're going to have to come back again later.

We move now to Mr. Sopuck for seven minutes.

Mr. Robert Sopuck (Dauphin—Swan River—Marquette, CPC): I really appreciated the testimony from the witnesses. Your expertise is evident and we are benefiting from it.

Dr. Ridal, I was looking at your slide on rural projects that lists erosion control, fencing projects, farming BMPs, shoreline stabilization, and so on. Let's just take a tributary, for example, where the riparian area is bare, and then you grass it, revegetate it, plant trees, and so on. Can we quantify the phosphorus reduction from those kinds of activities?

Dr. Jeff Ridal: The best way is actually to do the modelling based on the actual particular activity. What we have seen, and I've talked to people who do this, is that it is actually really tricky to go to one site and say that this is how much we've lost or how much we've improved. What I would tell you from my experience is that when we look at tributaries right now within the St. Lawrence that, given the soil characteristics and given the type of land use characteristics are at 100%, when you compare those to similar tributaries for which best management practices are used, they are down in the 50% to 60% range. That gives you an idea that there is about a 40% improvement. We actually use that approach to set the delisting targets.

Mr. Robert Sopuck: That's most helpful.

In my previous life, I've been involved with agricultural conservation policy. What I hear, Dr. Ridal, is that we do have the tools in our toolkit to manage landscapes in a holistic way, but the issue really is one of scale, isn't it? We're not doing these treatments over enough of the landscape.

Dr. Jeff Ridal: That's right.

It's an interesting comment. It's interesting in relation to Dr. Taylor's comment about why you would pick on one farmer versus the other. It really is a sense of scale. What we really need across the Great Lakes is a program of implementation of best management practices. The greater the scale, the greater the uptake within the watershed, the more improvements you'll see.

Mr. Robert Sopuck: Of course, I would argue that we need a program of such a scale right across the country, but that's a discussion for another time. Our chairman knows exactly what I'm talking about.

I'm a very strong proponent. If you look at our report on the national conservation plan, in which we make recommendations to the government, one of the recommendations was that Canadian agricultural policy should be changed to something more along the lines of European and American agricultural policy, in which they have major landscape-scale ecological goods and services programs. That will solve many problems at the same time.

That's just a comment on my part. I know that you all agree with it.

Dr. Ridal, in terms of your restoration councils, I was interested in the composition of them. Were farm groups like the OFA and others part of those stewardship councils?

Dr. Jeff Ridal: With regard to the stewardship councils that we were involved with, that we were working with, those stewardship programs in Ontario are actually focused on non-agricultural landowners and those particular problems, but there were.... I didn't actually include the OFA, but it was represented. In fact, the chair of the restoration council is a member of the OFA and is a farmer.

Mr. Robert Sopuck: It's just that even though their numbers might be small, farmers control an inordinate amount of land. I'm a farmer myself, and I think a couple of members on this committee are as well, so I think it's a group that really has to be front and centre in all of these. I'm sure you are aware of that.

Dr. Taylor, when I looked at the graph in your presentation, I was shocked at the decline in fish biomass. What is the cause of the decline in fish biomass from, let's say, 1986 to 2006? That's a staggering loss of biomass.

Dr. William Taylor: Yes, and it's poorly understood.

I think some of the fisheries people say that we've cut back phosphorus too much. I don't believe that myself, although it might be part of the answer. I think they've stocked too many fish. I think they've stocked large numbers of fish without considering what the ecosystem can support. Those fish have mopped up their prey and have starved themselves to death.

● (1635)

Mr. Robert Sopuck: Would that be the salmon you're talking about primarily?

Dr. William Taylor: Of the returning fish, 85% are wild, but they're still stocking huge numbers of fish into the lake, and those fish are simply starving.

Mr. Robert Sopuck: Dr. Taylor, I was very interested in your comments about the size of the organisms and the phosphorus moving up the food chain, and I think it's a long or a short food chain.

Given that these small organisms like your copepods and daphnia are terrific fish food, why would the phosphorus stop there? You would think that would improve fish production.

Dr. William Taylor: When there is too much phosphorus and you get blooms of those same algae that are harmful to humans, they are also unsuitable food for those zooplanktons. They can't feed on them and they're toxic.

In some cases it's because if there are not enough top predators those alewives will get so abundant that they mop up all the zooplankton, and again, there's no way for that phosphorus to get up the food chain, which is a situation we had in the 1960s and 1970s.

Mr. Robert Sopuck: Dr. Taylor, you talked about managing the area as an ecosystem. We could all say that, and I mean that with the greatest respect, it's difficult to do. Can you give us any specifics about what you mean by that? What on-the-ground activities would you like to see happen as we march toward managing our ecosystems?

Dr. William Taylor: I would like to see the mandate of the Great Lakes Fishery Commission broadened to managing the whole fishery, not just the native species as they focus on now, and I would like to see the management of the water quality, which is mostly given to the IJC and the management of the fishery, which is the Great Lakes Fishery Commission.... I think those two organizations don't coordinate their activities and work toward common objectives. In fact, they have different agendas.

The Chair: Thank you very much.

We'll move now to Mr. McKay for seven minutes.

Hon. John McKay (Scarborough—Guildwood, Lib.): I join with Mr. Woodworth in saying this is a very excellent panel. You're also very depressing. I'm thinking about, was it Pogo who said, “We have met the enemy...and he is us”. That is, in some respects, the political problem we have here, that it's us. There is no bad guy out there doing it; a whole bunch of things are going on.

Dr. Bruce, at the end of your presentation you talked about ozone treatments being put in the sewers, but you didn't expand on that. What does that mean and what's the significance of that?

Dr. James Bruce: What has been found recently is that if you use ozone in water treatment, or in waste water treatment, you can remove many of those harmful chemicals that are getting to be pervasive in our water systems, the endocrine disrupters and the flame retardants and other things, which we know are toxic to some of the ecosystem, and probably to humans, although we're not too sure. Ozonization of either the water when it's treated in the water treatment plant will take out most of these chemicals, or ozonization in the waste water treatment will prevent them from getting into the environment in the first place.

Hon. John McKay: In a Coles Notes version, what is the operative aspect of ozone that removes or neutralizes some of these contaminants?

Dr. James Bruce: I have a paper at home that would give you the chemical reaction and I would be happy to send it to you.

Hon. John McKay: I suppose I shouldn't really ask for it because then I'll be obliged to read it.

Dr. James Bruce: No, I'd be happy to.

Hon. John McKay: I wouldn't mind the executive summary, just out of curiosity, because you're always looking for the magic bullet and I don't know whether this is or isn't, but it's an interesting....

Dr. James Bruce: It's a magic bullet, not the magic bullet.

Hon. John McKay: Professor Ridal is trying to get in there.

Dr. Jeff Ridal: Thanks very much for that opportunity. I have a chemical background; I'm a chemist, actually.

I won't get into detailed chemistry, but ozone is a strong oxidizing agent, just like chlorine. It is even stronger than ozone. In fact, in Windsor, where we actually meet with the IJC at this water treatment plant, instead of chlorine it uses ozone. The reason they put it in was to get rid of chemicals that caused taste and odours. It is a very strong chemical oxidant that has the ability to break down and destroy those chemicals that Dr. Bruce was talking about.

● (1640)

Hon. John McKay: I'm assuming for every action there's another reaction that goes on. Is this a good reaction or not?

Dr. Jeff Ridal: With ozone there are sometimes disinfection byproducts. In drinking water issues it usually smells and tastes a little bit like bananas. Certainly, it depends on the source water quality that's coming in. That's a fairly rare case. In the case of Windsor, they don't have any disinfection byproducts in that particular case. I wasn't actually aware of this information, so I find it quite interesting.

Hon. John McKay: Maybe in Windsor they just like bananas.

Dr. Taylor, your target which Mylène referenced in her question, was that target set based on modelling in the 1970s?

Dr. William Taylor: Yes.

Hon. John McKay: Maybe it's time to take a new look at the modelling.

Dr. William Taylor: Certainly, there are more sophisticated models that we could apply now. On the other hand, they are also very data hungry models. I don't know whether for a research program data could be collected to supply a more sophisticated model for an area in the Great Lakes.

It's commonly done in research, but I think it's going to be a long time before we have the monitoring data for a whole great lake that we could routinely use with a more sophisticated modelling approach. That said, I'm not a modeller, but I think that would probably be the case.

Hon. John McKay: Dr. Chow-Fraser, the core of your presentation had to do with the levels of Georgian Bay in particular; that's where your focus is. Routinely, there are requests at IJC to draw down water for whatever reason. Currently, I think there is one in Wisconsin which wants to move from one watershed to another. It's about nine million gallons a day. Nine million gallons a day, as one application, may not mean too much, but 100 of them really starts to mean something.

Given that your observations are highly influenced by levels, what would your recommendation be not only to the government but to the IJC?

Dr. Patricia Chow-Fraser: Changing water levels have implications for the volume of the water, obviously. So whether it's in the nearshore or on the offshore are actually two different things. I'm talking about the nearshore.

For the nearshore environment a drawdown of half a metre or a metre, when your wetland on average is only about three or four metres, means that's a quarter of the volume of water. That's a huge effect. More than that, it's not just whether it's drawn down or up, it's the fluctuations, the natural fluctuations which are very different in the Great Lakes.

In the Great Lakes, we have a 30-year cycle of up and down. People can probably remember that in the 1970s and 1980s we had very, very high waters. Then in the 1960s there were very, very low waters. It tends to cycle like that naturally.

What's happening now, which is really unusual for Lake Michigan and Lake Huron, is that it has stayed low for the last 15 years. We do have a sense that some of that is definitely because of climate change, but some of that is also because of the dredging of the St. Clair River, which has also exacerbated that.

The Chair: We're going to have to leave it at that point.

We'll move now to Mr. Chisholm, for five minutes.

Mr. Robert Chisholm (Dartmouth—Cole Harbour, NDP): Thank you to the panel.

This has been a frightening presentation, frankly. I'm the fisheries and oceans critic for the official opposition, and I very much believe in the breaking down the silos aspect of dealing with this: deal with fish, deal with water quality, and deal with the environment together.

I'm frankly so alarmed by the changes to the Fisheries Act. I guess that's partly my question. The changes to the Fisheries Act and the regulations that came forth subsequently set the walls even higher. We're looking at fish and we're looking at their economic value, and that's kind of it. It took away the powers in the Fisheries Act with respect to HADD, to do the kinds of things you're talking about with respect to habitat, an ecosystems approach.

I'm so interested in what you have to say, but again, I find that our ability to deal with what you've said has really been impacted because of some of the legislative changes we're making. I would ask the four of you to comment, please.

● (1645)

Dr. Patricia Chow-Fraser: It's really critical that we look at habitat, because without the habitat we don't have the small fish and we don't have the big fish. This is actually one of the major things that our research is showing now. When you don't look after the breeding habitat, when you're only looking at the big fish, like the muskies that grow to 54 inches, what we're finding now in Severn Sound is that there are no more young muskies because the habitat is gone, because it has dried up, and there's no oxygen where there should be.

In terms of actually having the leverage to try to protect this habitat, we don't anymore, because the large fish aren't using it. It's the small fish. I absolutely agree with you: it has to be habitat.

The Chair: Does anyone else want to respond?

Dr. Taylor, do you want to respond?

Dr. William Taylor: I can only concur. It's all about habitat. I mean, fisheries management; it's a bit of a strange term. We can manage people, and we can do what we can do to fix the habitat. We really can't manage fish. They do what they want.

Dr. James Bruce: Also, we have to remember that the fish are rather mobile creatures. If you think of an area as being a good place for controlling fish and you designate that as an area to control, you have to remember that those fish probably came from somewhere a lot further away, upstream, or downstream possibly; so the selection of areas where you would apply the habitat provisions of the Fisheries Act is I think a very unfortunate move.

Dr. Jeff Ridal: Yes. Just to make it unanimous, I don't think you have too many scientists who were cheering for the changes that we saw. Be that as it may, we need to echo those comments already made about fish habitat.

I have a little story. There's that little tributary that I showed you in my slide with respect to phosphorus. It turns out that it's one of the most important walleye runs and nursing habitats. It stops at what is a historical dam and it's obviously the end of the spawning run at that point. In terms of how much more extensive it was in previous years we can't say, but it shows the limitations when you start to encroach on habitat.

Mr. Robert Chisholm: It's interesting that in the constituency I represent, which is urban-suburban, there has been an increasing amount of conservation work being done to try to repair damage that has been done, going right up past shopping malls and that kind of stuff to a lake now, to the point where there are gaspereau returning. It can be done, but if we keep damaging it, it does leave more....

My last question, I guess, is—

The Chair: You're going to have to leave your last question for—

Mr. Robert Chisholm: My apologies, because I have to go, but I do want to follow up with you and learn more about the work you're doing.

The Chair: Thank you, Mr. Chisholm, and thanks for joining us today.

We'll move now to Mr. Toet for five minutes.

● (1650)

Mr. Lawrence Toet (Elmwood—Transcona, CPC): Mr. Chair, I'll give my time to Mr. Sopuck.

Mr. Robert Sopuck: Thanks.

Regarding the Fisheries Act, being on both committees and having involvement with changes to the Fisheries Act, let me try to set your minds at ease in terms of what the changes mean.

Dr. Chow-Fraser, you talked about how over the last little while there are no muskies due to the fact that the muskie habitat has been lost.

Dr. Patricia Chow-Fraser: No, the large muskies are still there. People can still fish them.

Mr. Robert Sopuck: But muskie production has declined because of a lack of habitat.

Dr. Patricia Chow-Fraser: The recruitment, yes.

Mr. Robert Sopuck: Over how many years did that habitat loss happen?

Dr. Patricia Chow-Fraser: That probably has been since about 1999.

Mr. Robert Sopuck: That was under the old Fisheries Act, wasn't it?

Dr. Patricia Chow-Fraser: Yes. Well, absolutely, but it's—

Mr. Robert Sopuck: Excuse me, but that tells me that the old Fisheries Act was ineffective.

Mr. Robert Chisholm: I started something.

Voices: Oh, oh!

Dr. Patricia Chow-Fraser: I wouldn't say it was ineffective, no.

Mr. Robert Sopuck: But having the old Fisheries Act in place did not help with this serious decline in muskie habitat.

Dr. Patricia Chow-Fraser: What we're talking about here is invasive species coming in. The Fisheries Act does not necessarily fix everything that—

Mr. Robert Sopuck: But you attributed the muskie decline to a loss of habitat. I'm making the point—

Dr. Patricia Chow-Fraser: No. Okay, I'm sorry; what I'm saying is that we have to look at the habitats in order to manage it—

Mr. Robert Sopuck: As a fisheries biologist myself, I will never argue with that. Of course we have to look at the habitat. The question is the legislative mechanisms that are in place.

When I look at the status of fisheries across the country, most of them are in fairly decent shape, but again, where they are not in decent shape, where we are losing habitat, such as in some watersheds in B.C., all of that happened under the old Fisheries Act. I would submit that the old Fisheries Act was overly broad, overly prescriptive, and mandated by the courts in such a way that the effect on actual fisheries was minimal.

For example, our new Fisheries Act allows partnerships with local groups. We formed a $25-million program and created the recreational fisheries conservation partnerships program. As of last July we funded 100 fisheries habitat projects across the country in cooperation with angling groups. Perhaps some of you are aware of the program. There are over 100 more habitat projects about to be announced. With the extra $15 million in our recreational conservation partnerships program, we are easily looking at another 200 habitat projects across the country. Those kinds of partnerships are allowed because we have a new Fisheries Act.

Dr. Ridal, don't you think that's a worthwhile change in the Fisheries Act?

Dr. Jeff Ridal: Absolutely, I think in terms of the projects under way, I do agree that any project to improve habitat and to...is effective.

In a sense, I guess everything can be criticized one way or the other in terms of what our concerns are. That's the business of politics. Ultimately I think time will tell, right? We'll look over history to see whether or not, unless there's a change....

I'm sure we're not going to convince you to change the Fisheries Act now that it has been changed. Certainly the concerns have been out there. I'm not a fisheries scientist myself, so I would admittedly not be in a position of authority to speak on it. I simply believe there are concerns with respect to aspects of the Fisheries Act with respect to not protecting...or the focus on economically viable fisheries and a loss of focus on, as Dr. Chow-Fraser mentioned, the other species that often support the fisheries.

Mr. Robert Sopuck: Again, I would urge you to read the Fisheries Act. The act specifically talks about fish that support recreational, commercial, and aboriginal fisheries. The forage fish species are under the Fisheries Act.

The key is not economically important fisheries. There are fisheries that are important to people. There may be a small town with a small lake close by that's not worth a lot of money, but the kids like to fish there. It may not generate a huge tourism boom for the town, but that is an important fishery.

I think a focus on the fisheries that people actually care about, that people use, that people want.... You're actually going to see that probably 90% of Canada's watersheds are covered by that definition. Most of B.C. is.

Again, I would urge an open mind in terms of the Fisheries Act. I would look at the data itself. I would make the point that the predictions for the 2014 Pacific salmon run are a record in history. You might want to see some of the predictions there. While I'm not brash enough to take credit for that, I will make the point that this magnificent salmon run will have occurred on our watch as a government.

Thank you.

● (1655)

The Chair: Thank you, Mr. Sopuck.

We'll move now to Mr. Choquette.

Mr. Choquette, you have five minutes.

[*Translation*]

Mr. François Choquette (Drummond, NDP): Thank you, Mr. Chair.

My questions are for Ms. Patricia Chow-Fraser.

Among other things, you talked about the consequences of climate change on the water quality of the Great Lakes. I do not know if you have established a link between climate change and water levels, but I know that you talked about the levels of offshores waters. You said that the average water level was 176 metres. That is what I remembered, although it might have been a different figure. This year is a record year. You can see that in the long term, water levels are going down. Can you tell me whether this is possibly connected to the problem of climate change?

You also talked about water temperature. This also concerns me. They say that water temperature could affect water quality. I think that you said that a temperature of 27.5 degrees Celsius is dangerous for northern pike, which would not be able to feed itself anymore.

Lastly, I will ask you a whole series of questions, because I have so many.

You also said that the government should play a greater role in research, of course, I am thinking of the experimental lakes in Northern Ontario which the Conservatives have unfortunately abandoned.

All of these things which we are discussing are not even included in the official study we are currently undertaking. It would truly be a shame if the final report did not address these matters, including climate change, water levels and water temperature.

I would like you to tell us what you think about these things.

[*English*]

Dr. Patricia Chow-Fraser: Okay.

I'm not a climate scientist, but I know from reading that the global circulation models do predict that with climate change there will be a drop in water levels. This is a link that I don't do research in, but this is what I've read. This drop in water levels that we're seeing now is predicted. I think that a lot of people are saying that it is climate change related.

There's not very much that's known about the temperature of the water changing as a result of.... There's a site-to-site variation. A lot of that warmer temperature is a result of not having snow covering the ice on the lakes during the wintertime so that it actually gets a head start with the warming. Some of the graphs I wasn't able to show you show that in the last 10 years, for instance, deviations from the norm have increased a lot over the areas that we've sampled.

It's also because of the bathymetry of the lakes. When you have a gradually lowering water shape of the basin, as water goes down, it's going to heat up. Basically, it's a function of the shape of the basin. That's also a very site-specific thing. Deeper water is not going to be affected as much because it's in the middle of the water column, so it's the edge. Whenever you have a lip around the lake, like Georgian Bay in the Severn Sound area, it's very prone to that kind of heating up. It would definitely be important for you to include temperature as one of the effects of the quality of the water because that's what's governing whether the fish can go in or not.

Dr. James Bruce: May I add to that?

Except for this year, we've seen a very steady decline in the ice cover of the lakes. Much of the evaporation from those lakes occurs in the winter period. You see a lot of water going into the atmosphere from the lakes in the cold season. If you have them covered with ice, that doesn't happen; but if you have them open, it happens much more frequently. That has contributed, along with other things, to the decline of the level of Lake Michigan and Lake Huron. The surface water temperatures are going up as well, and we're seeing more runoff with increased frequency of heavy rain and snowmelt periods in the changing climate.

● (1700)

The Chair: Thank you very much.

We move now to Mr. Storseth, for five minutes.

Mr. Brian Storseth (Westlock—St. Paul, CPC): Mr. Chair, I want to thank everybody for coming.

Mr. Chair, I should actually say that I was asked to share my time with Mr. Sopuck, any time that I have left, but I doubt that will actually occur.

I have several questions. One is in regard to the conversation we've been having on Georgian Bay. Can you tell me how much the temperature of the water has increased and over what time period?

Dr. Patricia Chow-Fraser: I'm sorry, how much?

Mr. Brian Storseth: We were just talking about the increase in the water temperature. Can you tell me how much the temperature has increased and over what time period?

Dr. Patricia Chow-Fraser: What I was talking about was in the nearshore, in an embayment. I don't have the numbers for the actual lake.

In what I was talking about, what we were measuring was from the period from about 1999 to the most recent in 2013. It's that data set we were looking at.

Mr. Brian Storseth: In that data set, how much has water increased in temperature?

Dr. Patricia Chow-Fraser: We only have data from the last two years that we've been doing work on, so we don't know, but we know we are now approaching temperatures in the 27.5 range. That's the kind of thing for which if we had more historical information we would be able to see how much more it has been. But we can hindcast, and that's one of the things we're trying to do now, from satellite images. By the end of this year we will be able to tell you more about that, but right now we don't actually have buoys in the water measuring continuously as we might have in Lake Erie, for instance, or Lake Michigan or anywhere else.

Mr. Brian Storseth: Do we have the temperature increases in those lakes over the last several years?

Dr. Patricia Chow-Fraser: I don't know. I'm sure there is, but—

The Chair: Dr. Taylor.

Dr. William Taylor: Yes, I expect those data are available, but I can't speak to them.

Mr. Brian Storseth: Just from listening, I'm hearing about how the water is increasing in temperature, so I was just wondering what those increases were.

Another issue that I actually wanted to ask you about was the restoring of fish habitat. Do we have any scientific evidence that shows us the best way to go about this?

In the conversation, Dr. Taylor, we heard that phosphorus was perhaps one of the solutions to better the size of the fish that we're having. I found that very interesting. Do we have any examples from other places in the country or in the U.S. that would lead us to better outcomes here?

Dr. William Taylor: That's a difficult question.

Fish habitat, as Dr. Chow-Fraser is talking about it, is mostly spawning habitat in wetlands and tributaries and so forth, so those are critical habitats that have to be protected for fishery production.

I was talking about the growth of fish in the lakes. As a rule of thumb, over a broad range, the more phosphorus you have in a lake, the more fish production you're going to have. But you can get to the point where you go over the top and you start creating hypoxia, to use a word that I've been waiting to use, low oxygen conditions where you then actually start reducing the habitat available to fish and having negative consequences. I would think in western Lake Erie we're at the point where there's enough eutrophication that the fishery is being damaged, whereas in the other lakes, if we were only concerned about fish, we might want more phosphorus and more fish.

Mr. Brian Storseth: I have two more questions for you.

One, you had talked about a more holistic solution. Can you give me an example of somewhere in Canada where this kind of more holistic solution has been applied and been successful? Two, after that, in regard to your comments on the fish starving themselves, could you elaborate on that process and why that happens?

Dr. William Taylor: I don't know, but I don't think there's an analogous situation in Canada to the Great Lakes and their issues. So I don't know; I can't cite a jurisdiction that takes a more holistic view. I think it's more commonly done in Europe. The Europeans are very aware that the fish stock is interrelated with the water quality and that approach to managing water quality through the fish stock is mostly developed in Europe, and they're very expert at it.

In response to your second question about the fish actually starving, I think in the Great Lakes for a long time salmon were stocked in terms of as many as they could produce in the hatcheries. First of all, in Lake Michigan they actually stocked so many that the prey fish ran out, the salmon started to starve, and the lake changed dramatically in other aspects of its species composition. It happened there first and then it happened in Lake Ontario. Most recently, it's happening in Lake Huron. The condition of the salmon actually falls off. Twenty years ago you could catch a 40-pound salmon in Lake Huron or Lake Ontario. Now you could win a fishing contest with a 20 pounder.

The fish are exceeding the carrying capacity of the environment and yet at the same time nobody is....

● (1705)

The Chair: Thank you, Mr. Storseth.

We'll move now to Madame Freeman again for five minutes.

Ms. Mylène Freeman: I have one question that came up from Professor Chow-Fraser's testimony.

You mentioned the lack of government support for your work. I don't know if you or your colleagues would like to speak to government support for science generally. What can we be doing more of?

Dr. Patricia Chow-Fraser: I think there's probably agreement among all of us that the Natural Sciences and Engineering Research Council of Canada has less funding to go around for research.

I know we are benefiting now from a new fund for the environment, Environment Canada's cleanup fund, for southern Georgian Bay and Lake Simcoe. I did receive funding for that, but that just started in this year, and that was for a very specific area in Nottawasaga, which I didn't have a chance to talk about here. There we actually have birds dying of botulism which is related to the low oxygen and the zebra mussels and blue-green algae. That's a very specific concern we have to solve there.

There are still a lot of areas where not a lot of people live, so there are not a lot of reports on where the best fishing holes are or how people want to protect them. Those are still areas that the fish are going to and that we need to protect, because ultimately, doing so benefits all the rest, but that's not being funded by governments because the areas we're getting a lot of money for are areas that are already in degraded conditions. We don't have a lot of funding for areas that are still in good shape but that are showing signs of going down. I think those are the areas in which I would like to be more proactive.

Dr. James Bruce: Where we've seen significant decline is in the government science departments: Environment Canada and Fisheries and Oceans. One of the important things that every one of us speakers has mentioned is the need for environmental monitoring and better environmental monitoring.

Pat Chow-Fraser talked about the water temperature monitoring, and the other speakers did too, and I did. I think the governments are in the best position to do monitoring rather than my academic colleagues, who have other things on their minds and who can't keep up a long-term record very well. The monitoring programs for phosphorus discharge into lakes, water temperatures, and all of the other factors we talked about should be done by the government, I believe.

Ms. Mylène Freeman: Is there anything more to add?

Dr. Jeff Ridal: As an NGO we don't actually have that much access to the NSERC funding that's been talked about, but we are fortunate to have access to government funding, primarily through this Canada-Ontario agreement, which means that the money gets transferred from the federal government to the province to manage the Great Lakes and for these AOCs.

As I mentioned, I think one of the biggest fears you have locally in an AOC is that if you agree to delisting, you know you're giving up funding. This is one of the challenges that you face. It's sort of a no-win situation, and yet what do you do? In fact, in the St. Lawrence River Institute, our own organization, we were asked to vote on whether or not.... Basically do you give up funding? At the same time you have to look at the science and ask, ultimately, what the science is saying with respect to the status of this AOC, so you'd see what it would be going forward. If you're within an AOC, you do have some access to funding, but you don't if you're outside of it. I think that's a concern.

● (1710)

Ms. Mylène Freeman: It's a disincentive to actually—

Dr. Jeff Ridal: It's a disincentive.

Ms. Mylène Freeman: I'm going to give the rest of my time, if I have any, Chair, to my colleague.

The Chair: You have 10 seconds.

Ms. Mylène Freeman: Ten seconds. Well, thank you very much.

The Chair: I think we'll come back in another round.

We'll move now to Mr. Trottier.

Mr. Bernard Trottier (Etobicoke—Lakeshore, CPC): Thank you, guests, for coming today.

I want to follow up with Dr. Ridal.

You mentioned the areas of concern and the conservation authorities. I'm not so familiar with the Bay of Quinte and the St. Lawrence conservation authorities, but I am familiar with the Toronto and Region Conservation Authority. I meet with them frequently.

Can you clarify whether each area of concern has a conservation authority working on studies and projects?

Dr. Jeff Ridal: In Ontario, as you know, every major watershed has a conservation authority, so if the area of concern falls within that watershed authority, then you are pretty much guaranteed that the conservation authority would have been a major player in the AOC. There are others in some of the northern communities that don't have those conservation authorities and would not have had an obvious seat for housing the local concerns so the community would have had to find a way to make that happen.

Mr. Bernard Trottier: My experience is that they do some excellent work—

Dr. Jeff Ridal: Yes, they do.

Mr. Bernard Trottier: —at different levels too. There is some data gathering, for example, on species. They also do a lot of consultations, education, and outreach.

As you mentioned, the remedial action plans are really important. I suppose at a local level, each area of concern would have its own set of priorities, so it's good that there's this, if you will, bottom-up approach to putting in remedial action plans.

In Toronto, for example, there are a lot of projects around some habitat restoration that they're doing at some of the different watersheds there, some invasive species work on sea lampreys, and even some studies and early plans with respect to Asian carp, for example. Hopefully, that will not hit our shores.

Can you clarify the funding models for the conservation authorities? I am under the impression that the federal government does provide significant funding for each conservation authority. Is it different for the different conservation authorities across Ontario?

Dr. Jeff Ridal: Other people may have something to add, but actually conservation authorities are funded primarily at the lower tier, usually by municipalities. I don't know, but perhaps Dr. Bruce might know, whether the Province of Ontario actually funds it.

The funding that comes in through COA-type funding is very important for conservation authorities, as it has been in our area and also for the River Institute and its work. The size of the municipality obviously makes a big difference with respect to the complexity of problems, so certainly the Toronto and Region Conservation Authority is known to be the flagship conservation authority. It is really quite integrated and quite evolved with respect to the abilities that they contain. As you go out, for example, Cornwall, which is essentially an area where they have a regional conservation authority, it is an office of about eight people, just to contrast that.

Dr. William Taylor: I'll just add a little bit. I know that my conservation authority, and I think all of them in Ontario, do receive provincial funding as well as from the municipal governments and raise their own money. What would really help them is if they were eligible to be industrial partners and then work with researchers and get strategic project grant money, for example, from NSERC, but they are excluded as partners in those partnership programs. That's low fruit.

● (1715)

Mr. Bernard Trottier: There is a funding envelope federally from the Great Lakes program also. I know the Toronto conservation authority receives some federal funding also. I'm not sure if it's different for different conservation authorities.

Dr. Jeff Ridal: Yes, the federal program is the cleanup fund program, and if you are in an AOC, you have access to that cleanup fund.

Mr. Bernard Trottier: Okay.

Dr. Jeff Ridal: Toronto would get a fairly significant proportion.

Mr. Bernard Trottier: The Great Lakes is an enormous watershed, and there's a mix of urban and rural challenges. A city like Toronto with five million people in the GTA, and similarly Chicago, Detroit, and Cleveland, can certainly exert all kinds of strains on Lake Ontario, whether they're effluent problems or stormwater runoff.

What's your sense when you talk about water quality in the Great Lakes? Is it more because of urban populations, or is it more because of agricultural and rural issues?

Dr. James Bruce: I can't answer the question because we don't have a good fix on the amount of various kinds of pollutants, including phosphorus, coming from urban areas and agricultural areas. If we had good information, I could answer your question, but we don't have the monitoring data to answer it.

Mr. Bernard Trottier: Fair enough.

The Chair: We have to leave it at that.

Thank you, Mr. Trottier.

Mr. Woodworth, you have five minutes.

Mr. Stephen Woodworth: Thank you very much, Mr. Chair.

I want to preface my remarks by responding to some of the comments from some of the members that I find a little odd about this being frightening. I want you to know, professors, that I find this all very exciting and not frightening at all because of the cutting-edge research that all of you are doing, the obvious federal government funding of the research, the Great Lakes nutrient initiative, the progress in the areas of concern, the great Canada-Ontario partnership agreement. I see a good arc of progress and while I certainly know we have to be vigilant and we always have to be concerned to meet new challenges, I think we're on a great path and I have every confidence.

Regarding the Fisheries Act, the International Joint Commission and the Great Lakes Water Quality Agreement and the Canada-Ontario agreement are all mechanisms by which that ecosystem approach that we've discussed can and I am confident will be implemented. It takes those broader approaches to deal with ecosystems rather than an act that is just targeted at fisheries. Again I think we're on the right track.

Finally I will say that the conservation authority groups that I'm aware of are all eligible for that recreational fisheries partnerships program that Mr. Sopuck mentioned, which is specifically designed for strategic programs to increase the recreational fisheries and the flow of waterways for that purpose.

All of that is by way of a too lengthy preamble.

I want to go back to Dr. Bruce to return to my question from long ago and far away. Are there any specific geographic areas of concern that should be added to the list, that we should think about prioritizing, apart from, as we've discussed, the ecosystems approaches in western Lake Erie especially and in the Lake Huron area?

Dr. James Bruce: I don't know of any areas that would be comparable to the areas of concern that were originally designated, but certainly we do have to be worried about the whole lake effects in Erie and Ontario and in Georgian Bay. I think that is going to keep people busy for a long time.

Mr. Stephen Woodworth: I think that's the tenor of a lot of evidence we've heard and I think you're quite right.

Professor Chow-Fraser, on the issue of the St. Clair dredging, I know that the International Joint Commission recently released a report, “International Upper Great Lakes Study”, which was a five-year, $17.6 million peer-reviewed study. It held hearings and identified a number of items, but I don't know whether they commented on this issue of the St. Clair River dredging. Do you know whether they did? What was their position?

● (1720)

Dr. Patricia Chow-Fraser: Yes, they did. The upper Great Lakes study recommended not to take any action, but the IJC said they should be pursuing it and then looking at restoration of some of that dredging that had not been licensed. They were permitted to dredge to a certain amount, but the erosion has taken it down further.

There are now studies by the Corps of Engineers to restore some of that riverbed.

Mr. Stephen Woodworth: Do you think that's heading in a reasonable direction?

Dr. Patricia Chow-Fraser: Yes, absolutely.

Mr. Stephen Woodworth: Thank you.

I'm trying to pick up on a variety of things, Dr. Ridal. On the Bay of Quinte work that's being done, would you characterize the contribution of the Government of Canada as insignificant or as major?

Dr. Jeff Ridal: I don't manage the funds through the Bay of Quinte, but my sense of it is that it is an amount comparable to that of the province.

Mr. Stephen Woodworth: Okay, that's very good.

Dr. Bruce, I think you mentioned a concern about increased levels of mercury and that concerns me. I wonder if you can give me any direction about what you think is the source or the cause of the increases you've mentioned.

The Chair: A very quick response, please.

Dr. James Bruce: Mercury is mostly transported into the lakes now through the atmosphere, so it's atmospheric deposition. One of the major sources is coal-fired thermal power plants in the U.S., and a measurable source is from China.

The Chair: Thank you.

We'll move now to our last questions of the second round. We go to Mr. McKay for five minutes.

Hon. John McKay: Mr. Chair, it does amaze me what excites Mr. Woodworth.

Some hon. members: Oh, oh!

Mr. Stephen Woodworth: I have a passion for this.

Hon. John McKay: Yes, a 30% cut at Environment Canada is a very exciting thing. I don't know how reducing your budget by 30%, and your staffing by 15%, and your climate change by 77% can get much more exciting than that. For those of you looking for help from the Government of Canada on monitoring data, good luck.

Now, I thought I'd give Dr. Taylor the opportunity to tell us what biomagnification means.

Dr. William Taylor: Biomagnification is the process where a hydrophobic contaminant, but also mercury, increases up a food chain with each trophic level. The predator has more than the prey; its predator has even more, and that's why we call it biomagnification.

Hon. John McKay: Okay.

One thing I've learned over the course of these few meetings is that I started out with the view that zebra mussels were good, and I've come around to the view that maybe they're bad. I take it that the big issue is that they concentrate the phosphorus and that's not generally a good thing. Looking at eutrophication in the Laurentian Great Lakes map here, I would have thought there'd be some massive bloom coming out of Toronto of some kind or another. Is there any reason that there is not a bloom out of Toronto? Is the bloom off the rose in Toronto?

Dr. William Taylor: I don't know about the water quality in Toronto harbour. I haven't heard of major algal blooms there, but there are nearshore fouling issues all along the north shore of Lake Ontario. We had funding for some time from OPG because of the nuclear power plants being clogged by nearshore algae, and taste and odour problems.

Hon. John McKay: And the big runoffs when there's a flood event, the huge runoff—

Dr. William Taylor: The Humber River bloom, and so forth, yes.

Hon. John McKay: That's all in Mr. Trottier's riding, so it's entirely his fault. We in Scarborough contribute nothing to that.

Some hon. members: Oh, oh!

Hon. John McKay: Again, whether you're excited or whether you're depressed, you're saying your last point here is that there's no management strategy at this point to reduce mussels. In your fantasy world, is there any management strategy that would reduce mussels?

Dr. William Taylor: There isn't one right now, but I could imagine having imaginative fisheries scientists in the room and asking what eats mussels and what can we do in terms of management of the fishery to enhance those species. That's not even being discussed as far as I'm aware. It's not even being considered, let alone something more drastic like toxics.

Hon. John McKay: No, you don't want to go there. That creates other problems.

Dr. William Taylor: Probably not. I wouldn't advocate it.

Hon. John McKay: Okay.

Dr. Ridal, your presentation ends with public engagement.

One of the things that's true in Ontario in particular is that around lakes there's a 66-foot reservation in favour of the municipality. You can buy that 66 feet back from the municipality. You have to get it surveyed and all the rest of the stuff and pay people like Mr. Woodworth outrageous sums of money to do so, but at this point it has been a passive approach by various municipalities. Yet one of the points that all of you make is that the runoff is getting to the point where you're adding phosphorus in a massive quantity in these ever-increasing events. Has it been discussed, or is there any discussion or any thought with respect to municipalities becoming less passive, exercising their right of way, and mandating something like some growth of shrubs or bushes, or whatever, so the runoff isn't right into the lake?

● (1725)

Dr. Jeff Ridal: I think it depends upon where you live.

Locally, in a very agricultural base in the municipalities around Cornwall, they would not be very aggressive with respect to that, because they know where their voter base is, and you're losing revenue when you have setbacks.

Other areas that have a stronger tourism base, for example, as a base of the economy, will be.... Probably the best example right now is Lake Simcoe. To draw that into the public engagement piece, Lake Simcoe's phosphorus strategy is a set document which sets out the technical requirements, but which also creates a communication piece to say, “Okay, folks, we're going to do this together.” That is one of the strengths of that kind of “here's the plan” approach.

They have done some very good work in Simcoe, and Bay of Quinte actually has these numbers too, in setting out exactly from what different source each phosphorus is and where the phosphorus is coming from, how many megatonnes of phosphorus is coming from different places. In some places, the sewage treatment plant is actually a minor source, and more is coming in from the agricultural areas. That's where you then have a municipality coming forward and saying, “Yes, we'd like to see these improvements.”

This is the sort of thing that best management practice is. A lot of it is low-hanging fruit. A lot of it is just little things, but it all adds up.

The Chair: Thank you, Dr. Ridal.

Thanks to all of our witnesses for being here today and for your expert testimony, and also to all of our members for great questions.

I'm going to declare the meeting adjourned.