Canada-United States Law Journal

Volume 45 | Issue 1 Article 5

1-1-2020

Government Regulatory Panel

Katrina Kessler

Karen Stainbrook

Dr. Madeline Magee

Michael Alexander

Chitra Gowda

See next page for additional authors

Government Regulatory Panel

Authors

Katrina Kessler, Karen Stainbrook, Dr. Madeline Magee, Michael Alexander, Chitra Gowda, Tricia Mitchell, and Dr. Lucinda Johnson

GOVERNMENT REGULATORY PANEL

Moderator: Stephen J. Petras, Jr.

Speakers: Katrina Kessler, Karen Stainbrook, Dr. Madeline Magee, Michael Alexander, Chitra Gowda, Tricia Mitchell & Dr. Lucinda Johnson

MR. PETRAS: So, first, we're going to move into the regulator panel. We have seven panelists. We're allowing an hour and fifteen minutes for this panel. We've asked each panelist to give a brief summary of their thoughts and insights in response to this presentation in three to five minutes. Some will have PowerPoint slides, some won't. I do want to introduce the whole panel first, and then we'll go through each presenter.

We have Michael Alexander, who is Manager, Surface Water Assessment Section, Water Resources Division, Department of Environment, Great Lakes, and Energy for the State of Michigan.

We also have, next, from Minnesota is Katrina Kessler. She's Assistant Commissioner for Water and Agriculture Policy, Minnesota Pollution Control Agency for the State of Minnesota.

From New York, we have two panelists. Karen Stainbrook, Chief of Lake Monitoring and Assessment Section, and Donald Zelazny, Great Lakes Program Coordinator, both with the Department of Environmental Conservation for the State of New York.

From Wisconsin, we have Dr. Madeline Magee, Great Lakes and Mississippi River Monitoring Coordinator, BEACH Program Manager, Office of Great Waters – Great Lakes and Mississippi River, Department of Natural Resources, State of Wisconsin.

From Halton, Ontario, regional authority, we have Chitra Gowda. She is Environmental Engineer, Senior Manager, Watershed Planning and Source Protection, Conservation Halton.

From the International Joint Commission, we have Dr. Lucinda Johnson. She is a member of the IJC Science Advisory Board, Associate Director and Water Initiative Director.

And finally, from Environment and Climate Change Canada, we have Ms. Tricia Mitchell. She's the Acting Associate Regional Director General, Ontario Region, for Environment and Climate Change Canada's Strategic Policy Branch.

We will now start the presentation from our panelists. Our first to present is from Minnesota, Katrina Kessler. Katrina.

MS. KATRINA KESSLER: Thank you, Stephen and others. I just want to make sure you can see my slides. Can you hear me and see my screen?

MR. PETRAS: Yes, we can see your slides. They're not in presentation mode, but we can see them.

MS. KESSLER: They aren't in the presentation mode?

MR. PETRAS: No, they're in the, you know, PowerPoint . . .

MS. KESSLER: Okay, well, let's try again.

MR. PETRAS: There you go, there you go. Alright.

MS. KESSLER: Now you can see them?

MR. PETRAS: Yes.

MS. KESSLER: Okay. So, thank you to the Law Institute.

MR. PETRAS: It just went back to the . . .

MS. KESSLER: Okay, alright. We'll do it like this. We'll do it like this. Okay. Thank you to the Law Institute, and to Dr. Friedman and Dr. Creed, and I'm just going to get right into it. I'm going to speak from the perspective of the state environmental protection branch within Minnesota, it's called the Minnesota Pollution Control Agency, and speak to some of the challenges and the opportunities that I see on this topic.

Minnesota, which is shown here—you all know what it looks like—is the headwaters of three internationally important basins. So, we have a unique position in working with neighbors—international neighbors and interstate neighbors—to manage really important resources. To the north, the Red River; to the East, the Great Lakes system; and to the South, the Mississippi River.

And across the state, like other states and provinces that you're going to hear from, we have a really varied land use, geology, geography, and landscape use. So, we have old-growth forests, we have some prairie flats, and we also have a lot of the landscape that is dominated by agriculture. And while we're not seeing the extent of HABs in Lake Superior that you are in some of the other lakes, as noted, they are showing up. It happened twice in the last ten years. And as I think Irena or Kathryn noted, it showed up in the *New York Times*. In 2018, the *New York Times* did a story about algae along the Lake Superior shore.

And in both of these instances where they made the national news, it was the result of what I would say were five hundred year plus storm events. So, to the point of the changing climate and the increasing challenge in front of us, to think about how to manage water resources in the face of impact beyond what we've seen in the past, I think we need to really draw on data that looks at not only what we know today, but what we might know will be in front of us in the future.

And that is where I wanted to just start with what I see is one of the biggest challenges. In my role, we look at data from wastewater, and surface waters, and creeks, and lakes across the state. And this really highlights the fact that, even within the states and within local jurisdictions, there's divisions among who is collecting the data, who is regulating the data, who is talking to the partners. And I think we're all often very busy implementing the Clean Water Act, or the Safe Drinking Water Act, or making sure that if we manage local beaches or local recreational opportunities, that we're giving the public the information that they need at the moment. And often, it does not even allow us to take a breath and say, "Oh, what should my friends to the north know about this?" or, "I wonder what my friends to the east understand this to be?"

And in my role, I'm not only working with our state and local partners, but also as part of the Great Lakes Commission. And I think that this is both a challenge and an opportunity, because we have these international or national bodies that exist to, kind of, bring us together, but they don't necessarily have the

time or resources that are needed, and they don't necessarily have the hammer that is needed in these situations to drive the work forward. Nor am I saying that we should create more authorities, I'm just saying that the authorities that we have are often not working at the pace and the synergy that they should.

And so, this brings me to the second challenge, which really is data. Because I that think this is how we will fundamentally build the political and grassroots will to move forward. And in Minnesota, as shown here, we have a really systematic approach to monitoring. Every two of ten years, we are intensively looking at the water quality and biology in these eighty watersheds that are at like the HUC [hydrologic unit code] 8 scale, and we are taking all sorts of conventional pollutants, and we're taking flow so that we can understand loads, and we have lots and lots of phosphorus data and chlorophyll-a data.

But when the system was designed, we did not incorporate anatoxin, microcystin, and as a result, we are often behind the curve when these things occur. And we're out there, and we're trying to work with local governments to take samples, but we don't have the predictive tools that I think would be helpful when we all are faced with how to communicate risks, how to engage people on this.

So, I think about looking at, what do we have? I know, in Minnesota, when we've looked at the eutrophication standards that exist, we know that where harmful algal blooms are occurring, those waters are almost always already impaired for eutrophication, for our phosphorus and for our chlorophyll-a standard. So, that is something we can build on, and then kind of evolve into a more predictive approach.

And the other thing I'll say—and this is highlighted in the paper, and they did a really good job, Kathryn and Irena, of pointing this out—we do well when we have regulated frameworks. We have done a great job with wastewater treatment plants. In Minnesota, 99% of the flow is now regulated with really restrictive phosphorus limits. And that's made a huge result in our local resources. And we do not have the fish kills that we had seen twenty-five, thirty years ago.

And we have done a tremendous job in low-flow conditions. But the challenge in front of us is not low-flow. We know that the climate is changing, and as a result our landscape and our smart human counterparts are changing, and they're draining the land faster than they were in the past, so that even when we have decreasing concentrations at wastewater plants, or we're changing practices on the land, we're getting rid of the water faster, so the loads overall are not going down.

And this is highlighted in the paper too, but I think a lot about this from my vantage. We're great at regulating through the Clean Water Act, where we have a water quality standard, and we have to put TMDLs [total maximum daily load] together, and we have to issue permits. But when we have nonpoint sources, and we have to incentivize, and build relationships, and try to get to the economy and the hearts and minds of people to change behavior, we do not do very well.

And I will just highlight that, in Minnesota, as part of all of the Mississippi River basin states, we have a Nutrient Reduction Strategy to get us to our fair share of the Gulf of Mexico hypoxia goals. And again, we're trying as hard as we can. And I can tell you that, towards our goal of 2040, we are supposed to have 55% of the working lands in the state having cover crops, and we're right now at 2%. So,

for five years, the best we can do is a 2% increase, and we are supposed to be at 55% by 2040. And so, we just need to accelerate the pace, or change the way that we are coming at this.

And the last thing that I wanted to just talk about, because it's not all rainy day. I mean, I think there are a lot of opportunities, and this is really the nature and the crux of what we're supposed to talk about. I think that things like this, and the news that harmful algal blooms are getting, whether that's in Toledo or elsewhere, have really raised awareness. And maybe not political will at the national level, but I definitely think political will at the local level and at the state level, and at the level at which people are making decisions about protection of drinking water. That exists at a different intensity than it did in the past.

And the next thing I'll highlight here, we have a lot of data. We have a lot of information, and we have strategies, and we have published papers about it. And we just need to figure out how to connect it and accelerate the pace.

I want to give two examples of what I think has worked well in Minnesota. One of them highlights the IJC work. We recently, with our partners in North Dakota and Canada, actually worked with the International Red River Board to recommend to the IJC adoption of both nitrogen and phosphorus targets for Lake Winnipeg. And while they're not water quality standards that have the same regulatory "oomph" as you might [set] for Minnesota standards or Clean Water Act standards, they do set goals. And I think we work well when we have a target. And so, I would encourage us to think about what we need to do to move towards setting a goal, holding ourselves accountable, setting interim milestones, and maybe engagement and reporting out to those things.

The other success story I'll say. In Minnesota, we've started something called the Ag[ricultural] Water Quality Certification Program with our Department of Ag[riculture], and this is a voluntary program where farmers enroll through USDA dollars, as well as state matching funds, to get "certified" that the government will leave them alone for ten plus years if they adopt practices that are shown and quantified to minimize their nutrient input. And we've seen a really, really impressive growth rate there. Again, that is one of the places where we're looking for opportunities going forward.

And the last thing I'll just say is, I think that, as we think about where we can move with our science, I think predictive tools—maybe it's use of LiDAR [Light Detection and Ranging] or other GIS [Geographic Information System] tools—I think could help us, because even in states like Minnesota where we are investing millions and millions of dollars on monitoring, we are not at the level that we need to be. And nor do I think we should be monitoring everywhere all the time, but there are smart people who can help us figure out how to leverage what exists, and just take it to the next level so we can be more focused.

And so, those were my comments, and I will happily turn it over to the next member of the panel.

MR. PETRAS: Great. Great. Thank you very much, Katrina. Appreciate those comments. Our next presenter on the panel is Karen Stainbrook, Chief of Lake Monitoring and Assessment of the New York Department of Environmental Conservation. Karen.

MS. KAREN STAINBROOK: Thank you, Stephen. And good morning, everyone. I don't have slides or fancy pictures. I wish I had the time to do that.

So, in addition to being the Chief of the Lake Monitoring and Assessment section, I'm also a research scientist at DEC. So, we have many staff, DEC staff, that work collaboratively with our numerous local, state, federal, and non-governmental partners to understand and implement projects to protect and restore water quality in the Great Lakes. Overall, the Division of Water within the New York State Department of Environmental Conservation is tasked with protecting and conserving water resources in New York. We have, in New York, well-established, strong programs to address water quality impacts from nutrient over-enrichment, including narrative standards, statewide numerical guidance values for phosphorus, and several water body-specific numerical values.

Beyond the current nutrient criteria development effort that New York has, we have many programs to reduce the impacts through a range of regulatory programs. We implement our policies and priorities on a continuous basis through the water management cycle. This consists of five basic steps: monitoring, assessment, planning and development, implementation and permitting, and compliance and enforcement. These all work together—we call it the "water wheel"—to monitor waters, identify issues, and resolve them.

New York's Great Lakes Watershed Program is part of DEC, and they work to protect and restore water quality and ecosystem integrity in New York's portion of the Great Lakes—the lands and the waters. The Great Lakes Action Agenda guides this program to work with partners to improve environmental quality, conserve and restore natural resources, promote coastal community resilience to climate change, coordinate science and adaptive management, provide research, education, and training, coordinate community engagement and stewardship, and provide and identify grant funding.

Understanding and combating HABs is a top priority for New York State. We too use science to drive and inform decision-making and policy. With the direction and support of Governor [Andrew] Cuomo, New York State has become a leader in overall water quality protection, particularly regarding harmful algal bloom monitoring, notification, and response. New York State agencies—including Department of Health, Ag and Markets, Office of Parks, Recreation and Historic Preservation—have all been tasked with addressing, managing, or studying harmful algal blooms on a statewide scale in New York, making it one of the most comprehensive of its kind in the nation.

Since 2012, New York has documented HABs in over four hundred water bodies throughout the state. This includes everything from very small private ponds, to rivers, to medium and large lakes, to isolated shoreline areas of Lake Ontario. It is likely that the actual extent of HAB occurrence is even greater, since most water bodies in New York are not routinely monitored.

Based on our experience with HABs in New York, we know that across-the-board nutrient reductions, or a one-size-fits-all approach, will not prevent HABs in all water bodies. Several causes and contributing factors of HABs have been documented, but how those causal mechanisms interact, what management strategies could be used to reduce HABs occurrences, and which in-water bodies

controls will lessen the effects of HABs on water body uses—like swimming, boating, fishing—remain unclear. There are still gaps in the science of HABs, and this is a challenge for all of us.

In New York, we have prioritized research focus areas that are needed to advance the study, management, and mitigation of HABs. We believe that multi and interdisciplinary research efforts are needed to integrate knowledge about the mechanism of HABs occurrence, HAB control or treatment technologies, and nutrient reduction strategies—for example, agricultural conservation practices, best management practices, discharge permit limits—and that research is lacking on how these may be applied on an individual water body and at watershed scales, as well as how best to account for the uncertainty of the pace and extent of climate change.

In 2018, Governor Cuomo focused resources and efforts to prevent and treat HABs around New York. Since the start of that initiative, more than $82 million have been dedicated to HABs-related efforts. These include four regional summer summits that took place in 2018 that brought together experts in the field and local communities. We completed twelve HABs Action Plans for priority water bodies. We implemented advanced monitoring of HABs and real-time data sharing, and testing HABs mitigation technologies on several lakes throughout the state.

Building on this initiative, DEC has included HABs sample collection in the Ambient Water Quality Monitoring Programs, developed a system to compile and interpret near-real-time monitoring and surveillance information through the New York Harmful Algal Bloom System—we call it NYHABS —initiated and manage several ongoing HABs research projects, coordinate with state, local, nonprofit, and academic partners, and participate on several state and national interagency HABs work groups to identify gaps in science, mitigation, prevention, communication, monitoring, and how to close these gaps.

We recommend that the authors of this paper elaborate on the evolving science of how HABs, and how this uncertainty, could be addressed in the proposed framework. In addition, we recommend the authors consider how advancements in monitoring and modeling may change how we understand contributing sources, and how these would be incorporated in the proposed framework.

The paper provides a well-researched historical perspective on the programmatic and intergovernmental work to control HABs in the Great Lakes. Authors could strengthen their case by including detailed evaluation of specific regulatory tools available to the different jurisdictions to manage and respond to nutrients, document what work we have completed, and what we're actively working on. For example, discuss how state-completed TMDLs, state-funded and facilitated watershed-based management plans—which is a bottom-up approach—how the Domestic Action Plans for Lake Erie, the lake management action plans, or the New York State HABs Action Plans address HABs.

Further, to help the authors evaluate the need for a sub-federal binational framework, the authors could consider how these state provincial tools add value to the framework and assess how these actions are working. That's all I have, Stephen.

MR. PETRAS: Okay. Well thank you very much, Karen. That was outstanding. Our next presenter is Dr. Madeline Magee, Great Lakes and Mississippi River Monitoring Coordinator, Department of Natural Resources for the State of Wisconsin. Madeline.

DR. MADELINE MAGEE: Hi everyone. Thank you for inviting me to this symposium. And I hope you guys can see my slides, they're just pictures so you don't have to look at my face.

(Laughter.)

So, if you can't see them it's okay.

MR. PETRAS: We don't see them right now, so.

DR. MAGEE: You don't see them? Or you do?

MR. PETRAS: No. Are you sharing your screen? I think you . . .

DR. MAGEE: I am, but let me just try it again.

MR. PETRAS: There we go. Yep. Okay.

DR. MAGEE: Okay. Awesome. So, I will start off by saying that I agree with all the points that Karen and Katrina raised in their previous talks and, as a scientist at the DNR, I agree that there are significant challenges in reducing nutrients and addressing HABs in the Great Lakes Basin.

Professors Friedman and Creed raised many valid points in their writing. But any policy framework needs to address the need for more research into technology, the role of climate changes, funding, and large-scale systemic farming changes to be successful.

Despite new insights from HABs work on Lake Erie, we still lack important science information and advances in technology necessary to achieve improvements throughout the basin. Existing agreements focus on phosphorus reductions, but we also need to consider the role of nitrogen and reducing its input to the lakes, because it plays a role in biomass and toxin production pathways.

Next, information gleaned from Lake Erie does not always translate directly to other lakes and watersheds. For example, Lake Superior blooms and drivers are very different from those in Green Bay, Saginaw Bay, and Lake Erie. We need additional research into local conditions and mechanisms so that we can develop place-based strategies that properly balance all ecological objectives in the lake. Other than reducing nutrient loads from land to water, possible prevention measures and mitigation tools that we have in place for smaller lakes are difficult, expensive, and impractical to scale up to the Great Lakes level.

Finally, while authors correctly point out that Native Americans and First Nations must be included in agreements, they neglect to consider the importance of incorporating traditional ecological knowledge in science frameworks and policy actions.

As we've already discussed, climate changes present a major challenge to the success of reducing nutrient inputs into the lake. Since 2012, in Lake Superior, increasing frequency of significant flooding events results in inputs of sediments, nutrients, and possibly propagules to other lake, that can then foster the development of nearshore blooms. This is further exacerbated by Lake Superior's status as one of the fastest-warming lakes in the world.

These warmer water temperatures, combined with extreme precipitation events, create conditions ripe for HABs, in a lake where they previously did not occur on a large scale. Current runoff management BMPs [best management practices] in the whole Great Lakes Basin are not designed to accommodate more frequent extreme precipitation events, and they will not yield expected nutrient reductions, nor even be effective enough to offset anticipated climate impacts.

While enforcement measures are an issue in current policies, as we've discussed, insufficient funding is perhaps a bigger impediment to nutrient reduction goals. The Great Lakes Restoration Initiative has been invaluable in funding project implementation and increased research. However, additional significant increases in sustained funding at the national, state and provincial, and local levels for on the ground project implementation and staff resources are necessary. Funding mechanisms in place currently tend to reward those that rely on traditional nutrient reduction strategies, instead of promoting new ideas. Taking a lead from the State of Michigan's work on Asian carp, a competitive program where applicants vie for prize money may spur new innovative technologies for addressing harmful algal blooms.

Funding hurdles will be particularly challenging considering the impact COVID-19 has had on both sides of the border. However, if we are thoughtful in our resources, we may be able to leverage funds to jump-start both nutrient reduction and economic stimulus.

For much of the Great Lakes Basin, successful nutrient reductions will require significant change in farming and food systems. This is unlikely to be achieved with one framework. Large-scale investments and political will are needed to assist farmers in becoming more sustainable, and to develop the framework necessary to support small farms and local food systems. Tackling this endeavor, while ensuring small farmers can both support their families and increase food security on a local level, is a large task. This requires support and implementation assistance to local jurisdictions, NGOs, and extension agencies in each basin to be successful.

The greatest challenge is in designing meaningful reduction from land to water that will continue to function efficiently in the face of climate change-related stressors. The proposal laid out in this symposium is an excellent platform for discussion, and I look forward to the development of a framework that can effectively decrease HABs in the Great Lakes.

For this particular policy to be successful, it must work in concert with additional advances in science and technology, recognize and give greater consideration to climate change, explain a substantially increased funding mechanism, and develop a framework for significant systemic changes in farming practices across the basin. All of these must be achieved before HABs reductions can occur. Thank you.

MR. PETRAS: Great. Thank you very much, Dr. Magee, for your presentation. Our next presenter on the government regulator panel is Michael Alexander, Manager, Surface Water Assessment Section, Water Resources Division, Department of the Environment, Great Lakes, and Energy, State of Michigan. Mike.

MR. MICHAEL ALEXANDER: Good morning, everybody. I first want to say thanks for having me, and I really enjoyed the presentations. I don't have a formal presentation or slides, so unfortunately you get to stare at my face for a few minutes.

(Laughter.)

Thankfully, the panelists before me covered a lot of the same concerns that we have in Michigan. Our resources are vast. As you know, four out of five Great Lakes prefer Michigan.

(Laughter.)

So, you know, we have a lot to try and protect. Our programs have been successful, as other presenters have already described, in the point source controls. A majority of our NPDES [National Pollutant Discharge Elimination System] facilities are at one milligram per liter, or significantly less than that. We are part of the Annex 4 process, and our Domestic Action Plan for western Lake Erie called for a 40% reduction by 2025. In 2020, our goal was to have a 20% overall reduction, and I'm sure no one will be surprised that we have come close to that 20% reduction, mainly from point source reductions.

The goal going forward, I think—you know, the previous panelists, I think they hit it right—we need to continue to develop the science and the research, and better understand what's causing those harmful algal blooms in western Lake Erie and Saginaw Bay. And we are seeing a few in some of our inland lakes that we continue to monitor. But we do need to try and expand that science and understand what's triggering those blooms.

You know, we have, I think, a fairly good understanding about two of the major sources—point source, nonpoint source. It was interesting to hear about the atmospheric contributions and I'd love to hear more about that. But our biggest challenge, I think, right now, is dealing with the nonpoint source. The tools we have in our toolbox—as Minnesota, and Wisconsin, and New York have all said—it's been controlling those nonpoint sources. And the majority of our controls in place right now are voluntary. So, a struggle we have with implementing voluntary actions are getting them implemented in the right place—targeting the highest priorities, locations. And so, it would be interesting for the authors, if you could provide some insight as to, when you're implementing nonpoint source regulations, voluntary actions, how effective are we, or how could we be more effective, at implementing them at higher-priority areas?

Again, that's the research involved in it. We've implemented some plans for trying to do better watershed planning at a small scale, not only in western Lake Erie but around the state. But its time consuming, it's expensive and, you know, it's difficult at best. So, again, with our current tools in our toolbox for controlling nutrient inputs, it's voluntary for the nonpoint source.

So, if the authors could provide some insight about nonpoint source regulations around the Great Lakes, in the states that have compared them to others, how were they able to do that? What were the mechanisms that they had to develop to get those in place? It would be helpful for us, if we were to proceed down a more regulatory control for nonpoint source.

But at this point, you know, again, we are implementing our tools as best we can. They're voluntary actions. We're trying to take a more targeted approach, and we hope to see some success with that. And we're going to hopefully take what we learn in western Lake Erie and apply that in other parts of our state.

So, again, thanks for having me. I really appreciate it. I've enjoyed the discussion, and I look forward to hopefully making progress with this going forward. Thanks.

MR. PETRAS: Thank you very much, Mike. Appreciate those comments. All right, next we're going to move to a regional water resources regulator, Chitra Gowda. Chitra is with Conservation Halton. She is the Senior Manager for Watershed Planning and Resource Protection. Chitra, the floor is yours.

MS. CHITRA GOWDA: Thanks, Steve. So, I'm just going to share my screen. I do have some slides to share, so bear with me for a moment while I get that set up. Steve, can you please confirm you can see the title slide?

MR. PETRAS: Yes, we see it and we see it in the presentation mode.

MS. GOWDA: Wonderful, thank you so much. Okay. So, thanks again for inviting me to this panel. Lots of great discussions here. A really good discussion paper to look at, you know, by Kathryn and Irena.

And just for context's sake, I work at a watershed-based organization. So, it is regional, it is watershed-based. So, the boundaries are the watershed for Halton, and I work at one of thirty-six conservation authorities across Ontario.

So, to put into a bit of context, 95% of Ontario's population lives within a conservation authority. And we're formed under the Conservation Authorities Act in Ontario. And we also have a very strong role on drinking water source protection through Ontario's Clean Water Act, which is a little bit different from the United States Clean Water Act content.

I'm just going to move along in my slides. So, just some overall comments on science and policy, and then I'm going to provide some overall comments with respect to the governance side of the discussion paper.

So, first off, I do want to commend Kathryn and Irena for thinking about this concept, putting the discussion paper together. It was quite thorough, with lots of great published science summaries, you know, talking about the current legal framework and proposing a new sub-federal approach to managing harmful algal blooms. So, again, they need to be commended for that entire research and thought process.

So, just a few comments on that is, again, just in-line with what everyone else has been saying, is that we know that the science of harmful algal blooms is quite complex. And this is ongoing science, so we haven't finished that research as of yet. And new studies are showing some quite surprising things.

And so with my third bullet points on this slide, that first sub-bullet point refers to a point that was from Kathryn and Irena's discussion paper which was quite surprising—again, certain agricultural best practices might be contributing to the plant-available phosphorus in the Great Lakes, and therefore supporting the algal blooms.

And another study—a very recent one, August 2020 actually, by the International Joint Commission—they're looking at pairing different stressors and

looking at those combined effects or those combined interaction effects. So, for example, an increase in lake nutrients results in a decrease in PCBs [polychlorinated biphenyls] in fish. And so, there are some interesting studies that are coming up. We need to keep track of those.

And so, the discussion paper does allude to the fact that science and technology alone are not enough. We need to have some legal instruments and policies in place and strengthen the sub-federal approach. My comment there is that the ongoing scientific research itself, it does bear a direct influence on, you know, policies and where you apply them, and whether to apply them or not.

And so [I am] definitely not averse to implementing the approach on the policy side of things. But I think my comment to the authors is that, where policies are thought about, they need to be agile, they need to move with the changing science. And the one thing we know is that we have a changing science. We have climate change. The policies need to be agile. They will not be able to be stagnant. So, I encourage the authors to look at, you know, tackling that challenge of how to keep the policies up to date and in-line with current science. So, for example, if there are certain agricultural best practices that are, perhaps, contributing to the issue. Well, what does the science say in terms of how we can manage that? How should the policies evolve accordingly?

And, of course, the last point on this slide, which I think everyone can agree to, is that incentive programs are really good. They are not the magic bullet, we know that. But they definitely support science-based best practices.

Just moving over to some overall comments on the governance. The binational, state-provincial approach was quite interesting, and seems to have a strong case. I would suggest some modifications, though, in order to manage the harmful algal blooms, is to look at broadening that governance that you leverage, the different levels of governance that exist, while also recognizing—a very strong point in the discussion papers—that perhaps things are not quite working as they should be.

But we also need to think about the funding, and the action that [is] happening at various levels. So, for example, in Ontario, we do have thirty-six watershed agencies that are governed under the Conservation Authorities Act. And we have a variety of governance funding and action taking place there. Our board of directors of each of those conservation authorities are municipal elected officials. So, we have that very strong tie to our communities, our municipalities.

Also look at how the state-provincial approach can be incorporated into existing frameworks. And I'll get a little bit more into detail on that in the next couple of slides.

And of course, maintain ongoing scientific research as the basis for policies to be nimble, and agile, and to move along with the changing science.

And so, there's the current authority, and there's also potential for improved governance by federal government, should also be included I think within the discussion paper. And also, similarly along those veins, consider the local governance by municipalities and, within the Ontario context, the watershed organizations.

The discussion paper had a lot of information about the U.S. side of things and some information about what's going on in Canada. I would recommend that the authors incorporate the governance efforts and the plans that are within the Made-in-Ontario Environment Plan, which was developed by the province of Ontario last year, and also give due consideration to the local governance with conservation authorities, because they are on a watershed basis—lots of programs and services there to help support their reduction in harmful algal blooms.

And also, Canada, the federal government, has proposed a Canada Water Agency recently. And so, while that is not finalized, it is definitely an opportunity to look at exactly what Kathryn and Irena are talking about, which is perhaps a lack of, you know, legal instruments and strength within the federal governments in terms of managing harmful algal blooms. So, that is an opportunity for us to weigh-in on as well.

And so, on this slide, I just provide a bit of a concept, and it's only an idea. So, the center of this diagram speaks to the focus of the discussion paper, which is a strong state-provincial legal agreement, you know, in some way or form. But that alone needs to fit into the broader context. We have our federal governments, we have our municipalities, and other communities, including the Indigenous communities, and within Ontario we've got the watershed agencies. And all of these have relationships, you know, amongst themselves. And so, you know, there's support, of course, for strengthening the state-provincial approach, but it cannot stand alone. It would need to also look at the existing agreements and the existing pros and cons of everything else. And so rather than a top-down or bottom-up approach, you can see with the green arrow mark on the side is that there's governance to be recognized at all levels.

And this is my last slide, is to reconsider the Great Lakes Water Quality Agreement. It is a well-established framework for collaboration. That being said, Kathryn and Irena do a good job of opening it up and talking about the pros and cons and where, perhaps, there is more strength needed. It does not provide for long-term funding, it does not impose mandatory policies on the ground. And so, my suggestion to the authors would be to revisit the Great Lakes Water Quality Agreement structure and function, to perhaps incorporate their suggested sub-federal approach in a phased manner that is, again, well-connected and well-informed by ongoing scientific research. So, the two need to go in tandem—the approach and the scientific research. With that kind of approach, so looking at the Great Lakes Water Quality Agreement, we could leverage existing strong relationships, collaborations, while at the same time, addressing the authors' concern, which is the need for strengthened policy and implementation.

And that's it.

MR. PETRAS: Great. Thank you very much, Chitra. That was great. Our next presenter is Ms. Tricia Mitchell. She's the Acting Associate Regional Director General, Ontario Region, for Environment Climate Change Canada's Strategic Policy Branch. Trisha, the floor is yours.

MS. TRICIA MITCHELL: Okay. Can you see my slides?

MR. PETRAS: Yes.

MS. MITCHELL: And are they in the right mode?

MR. PETRAS: Yes.

MS. MITCHELL: Perfect. Okay. I wanted to start just by saying thank you so much for having me here today. On a personal note, I was part of the team that drafted and negotiated the 2012 [Great Lakes Water Quality] Protocol to the [Great Lakes] Water Quality Agreement, and I currently lead the Nutrients Annex under the agreement. So, being able to talk about Great Lakes governance and harmful algal blooms in one conversation, it's like Christmas morning for me. I'm going to have to work really hard to keep my comments brief, because I have a lot of them.

So first, I guess I wanted to start by just acknowledging how critical of an issue harmful algal blooms and toxic and nuisance algae in general is, in terms of a threat to the Great Lakes. And that's why, even though Canada, I think, is a pretty small player in terms of our loads—at least in the Lake Erie context, where our efforts have been focused to date, we represent about 10% of the loads. And really when we talk about the western basin, the harmful algal blooms, the science has shown that's really driven by the Maumee. But, nevertheless, I mean, we really have committed to doing our part, and we've invested a lot in addressing the issue.

The paper that we're talking about today asked the question about a sub-national governance framework, and would this be a better way to address the issue in the Great Lakes. And I think, while it does a very good job of identifying existing governance mechanisms, there's a few important points that are maybe missed, or that I'd like to bring forward as part of the conversation.

So, as the paper notes, we work together under the Great Lakes Water Quality Agreement, Canada and the U.S. cooperatively, to address water quality protection. And I think the important point is the way that we do this is we get together under the Water Quality Agreement and set out our shared goals and objectives, based on the best available science. And the agreement allows us to coordinate our monitoring and our science efforts—which we do, especially on this issue.

But then we each have sovereignty in deciding how we're going to get to those shared objectives—we can use our own domestic laws, processes, regulations, policies, and programs. And this is really important, because we don't have the same governance mechanisms on each side of the border. So, we can take that back domestically and decide how we want to get to the shared goals we've set out.

The paper references challenges associated with changing political landscapes, and I think one thing that our work under the Water Quality Agreement has allowed us to do over the last forty years is build strong relationships. And this allows us to maintain the course in spite of changing political and economic landscapes, either between the two countries or sometimes within them. This is really critical, and I don't think it comes out in the paper. We've been doing this for more than forty years and there is always going to be times where one jurisdiction or another has to pull back for political or economic reasons, and I think the states and the provinces are just as susceptible to this as the federal governments. And, thinking about COVID, I think we're all going to be figuring out how we deal with this, whether it's at the sub-national or the federal level. But having everyone around the table working in support of a set of shared objectives

and goals means that others can step in, or at the very least, we can maintain momentum, if one jurisdiction or another has to pull back a bit.

The next thing I wanted to highlight . . . Did my next slide come up? No. There we go. In Canada, the protection of water quality is a shared jurisdiction between the provincial and federal levels of government. So, for example, federally, we're responsible for boundary waters, but the province regulates pollution and sets water quality standards.

So, we also have gotten together, and we've have negotiated, or every five years we negotiate the Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health, and that lays out how Canada and Ontario are going to work together to implement the commitments that we set binationally under the Great Lakes Water Quality Agreement. So, because of this, I think it's really tricky to try and separate one jurisdiction out from the other. I don't think we can do it alone, and especially for issues like HABs where the jurisdiction is so shared.

In terms of harmful algal blooms, I would argue that we already have a very solid governance mechanism under the Great Lakes Water Quality Agreement and the Nutrients Annex Subcommittee. We have members from all of the relevant national and sub-national governments in the Lake Erie Basin, and we have some from outside of the basin who are experiencing HABs, such as Wisconsin. We also have representatives from Indigenous communities, the Great Lakes and St. Lawrence Cities Initiative, some municipalities, our conservation authorities are represented. And we have observers from the IJC and the Great Lakes Commission. And I can tell you, this is a very active annex. It's probably our most active annex under the agreement. We have senior-level engagement from all agencies. So, I would say we're already—and when I listened to the list of five elements that Kathryn outlined, of what we would need in a new mechanism—we're already doing all five of those things with all of these players around a table. So, we're already there.

Through the work of the committee, the governments have established phosphorus reduction targets for Lake Erie, as well as domestic action plans to achieve them. So, on the Canadian side, we have one plan, it's the Canada-Ontario Lake Erie Action Plan. We've identified more than 120 detailed actions that are going to move us towards the targets. The development of this plan was co-led by five agencies—two of them are federal, three of them are provincial. And its implementation is being coordinated by a team co-led by Environment and Climate Change Canada and our Ontario Ministry of Environment, Conservation and Parks, with significant input, as well, from our conservation authorities in the Lake Erie Basin, who are driving a lot of this action. So, again, just to show you how interconnected, jurisdictionally, our efforts are on this issue.

And for Lake Erie, so the other, kind of, thing I would point out is the paper does identify a number of areas experiencing HABs, but really the only ones where we have the science to demonstrate that a binational approach is warranted is the western basin of Lake Erie. I think the other ones are more localized issues, and often being addressed at the local level like, for example, the Hamilton Harbor is being addressed through our Areas of Concern program.

But, where we do have a binational agreement to action, there is a sub-national agreement in place as, as was pointed out, for the western basin of Lake Erie, where Ontario has committed with the U.S. to timelines by which they would achieve the targets.

So, I guess in the end what I would say is, I'd asked the question, what's missing? And the paper seems to imply that, because HABs continue to occur in the Great Lakes despite the existing governance mechanisms, that it means our governance framework is a failure. But, I would argue that this isn't the case. I think the problem of harmful algal blooms is a wicked problem. The science is extremely complex, it's ever-evolving, it's exacerbated by factors that are really difficult to control, such as climate change and invasive species.

So, I guess my last thoughts are, what we really need to turn a corner on HABs are three things. And they've been repeated a couple times in the presentation, so I'm happy to see that. We need innovative policy solutions. Sometimes shifts in approach—we're exploring things like precision conservation that was used with success in Chesapeake Bay. We need strengthened on the ground actions. And we need stronger accountability in terms of reporting on progress.

And I think this is where we need to focus our energy and our resource. And I would argue that none of these requires a sub-national agreement and, in fact, quite the opposite. I think this is a problem that needs all-hands-on-deck, and all of us at the table. So, I'll stop there. Thank you.

MR. PETRAS: Thank you very much, Tricia. Outstanding presentation. Our next presenter is from the International Joint Commission, Dr. Lucinda Johnson. She's a member of the IJC's Science Advisory Board, and Associate Director and Water Initiative Director at the University of Minnesota's Natural Resource Research Institute in Duluth, Minnesota. Lucinda.

DR. LUCINDA JOHNSON: Thank you so much, Stephen. And thank you, Irena and Kathryn, for putting together this very nice piece of work, and to the law center for bringing us all together. This is quite an amazing panel of experts and regulators.

I will add a disclaimer here: as a member of the Science Advisory Board, I'm much more of an academic than a regulator. So, I will just very briefly talk about the role of the IJC in the Great Lakes, and then provide some impressions on some of the work that we've heard about today. I chose not to put together any slides because I realized that, as the sixth or seventh speaker on the panel, most of the impressions that I had would have been mentioned already. So, I will take this opportunity to just highlight some of the comments that I have had, or some of the impressions I've had, and highlight some of the comments that have come before me.

So, just a reminder that the role of the IJC, across the board in terms of boundary waters, is to approve projects that affect water levels and flows. And then, secondly, to investigate transboundary issues, and recommend solutions affecting all manner of uses of our boundary waters.

In the Great Lakes, the IJC's primary role is to advise the parties regarding implementation and progress in meeting the terms of the Great Lakes Water Quality Agreement. One of the major roles that we have, and actions and activities

in the Great Lakes, is to conduct studies that provide us with updated and summary information on critical issues affecting the Great Lakes.

Most recently, the IJC has produced reports related to the phosphorus issue, starting in 2013, where they reported on total phosphorus and dissolved reactive phosphorus monitoring programs in the Lake Erie Basin. In 2017, they conducted a study on modeling approaches to affect nutrient management through adaptive management. In 2019, they completed a report on declining productivity, and another report on fertilizer application patterns in the Western Lake Erie Basin. Very recently, they completed a project looking at stressor interactions, which was mentioned by one of the speakers. And then very recently we completed a report on the development of an early warning system framework for the Great Lakes, which includes harmful algal blooms.

I want to now take a minute to remind folks about the sources of phosphorus which were mentioned in the report. And these include atmospheric deposition, potential changes to the redox environment, benthification of phosphorus dynamics, and nutrient dynamics as a result of dreissenid invasions, internal cycling, as well as nonpoint source delivery from tributaries, including runoff from agricultural fields and feed lots.

In the eastern part of the basin, agricultural runoff is the largest source of NPS [nonpoint source pollution]. But, across the Great Lakes Basin, it's just not at all clear what the major drivers are of harmful algal blooms. The setup of a bloom is affected by things like weather, the seasonal pattern of inputs of nutrients and, in particular, the geographic setting. So, what we can predict about harmful algal blooms in the western basin of Lake Erie does not always translate to harmful algal blooms in Hamilton Harbour, in Green Bay, and areas in Lake Superior, for example.

Another thing that, I think, has not been mentioned is that the pattern for nutrient dynamics is not the same in the nearshore as it is on the offshore. We've seen declining phosphorus concentrations leading to profound food web changes in the offshore of the Great Lakes, and that means that we need to balance the management related to tributary inflows relative to the cycling offshore.

So, as many of the speakers have mentioned, the implementation of regulatory standards and a legal framework may not be the best solution overall for dealing with harmful algal blooms. We may need a more localized approach and, in fact, as many of the speakers have mentioned, we probably need to be focused on local solutions that are driven through voluntary programs.

I'd like to mention one possible approach that the IJC uses for water level regulation, and that is the Great Lakes-St. Lawrence River Adaptive Management Committee. This committee focuses on providing monitoring, modeling, and prediction associated with water levels in the Great Lakes. The science that informs this adaptive management approach feeds through the [Great Lakes] Water Quality Board, and then informs the commissioners, who then inform the parties. Because this is an independent body that provides science, and monitoring, and different study approaches, this could be a model that could be used for providing information about harmful algal blooms across the Great Lakes, in the sense that it could provide the underpinnings of a monitoring, modeling, and

prediction system that could be applied across the Great Lakes, using a more localized approach where necessary.

As one of our previous speakers said—I think it was Tricia—this is a wicked problem, and we need some wicked solutions to address this very, very complex issue overall. Thank you.

MR. PETRAS: Thank you very much, Dr. Johnson, for that outstanding presentation. I believe that at this point we're pretty much on schedule, so I'm really proud of our panelists for doing a great job. I was a little worried about how we'd be able to do that, but you all did an outstanding job. At 10:45, the thought is we were going to start our academic NGO panel which leaves us two minutes.

I just want to throw out that, based on what everybody has said, it looks like there's a lot of science yet to be done. And there's a lot of consideration in terms of jurisdictional issues—especially, as Kathryn and Irena are emphasizing, the need for some type of enforcement mechanism in addressing harmful algal blooms. Does anybody have an additional comment on that, from the government regulatory panel? And by the way, once we finish the academic/NGO panel, we will hear back from Irena and Kathryn about their response to what they've heard so far. So, anybody on our regulator panel who would like to just look at those overall big issues: science, how do we pin it down, what more do we need to do, and jurisdiction/enforcement. Anybody? No. Okay.

I know that you all had comments and thoughts. It seems like people want to look at the federal level and keep it involved, and also, we need to even go below the state-provincial jurisdictions because we need to look at municipalities, counties, *et cetera* who also have an issue in terms of runoff *et cetera* that goes into the Great Lakes.

Well, that being the case, let's then proceed. We're right on time now to the academic/NGO panel.