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Keynote Presentation – Harmful Algal Blooms in the Great Lakes Basin: A Binational Sub-Federal Approach?

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KEYNOTE PRESENTATION – HARMFUL ALGAL BLOOMS IN THE GREAT LAKES BASIN: A BINATIONAL SUB-FEDERAL APPROACH?

Speakers: Dr. Kathryn Bryk Friedman & Dr. Irena F. Creed

DR. KATHRYN BRYK FRIEDMAN: Okay. Well good morning, everyone. Thank you, Governor Blanchard, I think Minister Peterson is on the webinar, Steve and Chi, thank you so much for hosting this symposium so that Irena and I could present an idea that we've been working on for quite some time now.

As Chi suggested, Irena and I have been collaborating on Great Lakes issues for well over a decade, and we've specifically been focusing on harmful algal blooms, probably within the last six years or so. Irena, of course, bringing the science perspective to the table, and I bring the law, and governance, and policy perspective to the table. We copublished an article last year, which really was the impetus behind our recent paper that the panelists have had a chance to look at, and this symposium.

It struck both of us that, you know, as everybody I'm sure on this call is aware, the governance system is not working. It's not working. Harmful algal blooms continue in the Great Lakes system and, in some cases, are exacerbated. They're becoming even more excessive. So, it struck us that the federal system, as great as it is, is maybe not working.

More importantly, as Governor Blanchard noted, maybe something can be done at the state-provincial level. As the governor mentioned, there is a long, long history of state-provincial engagement between Canada and the United States across a whole host of areas.

So, we did a little bit of research and realized that no one really explored this idea in detail. So, we put our heads together and came up with a paper, and Irena and I will summarize our approach in this presentation, and then turn it over to the regulators, and the NGO panel, and the academics in the room to provide their perspectives and comment, and then we'll open it up. So, with that, I'll start the presentation.

Okay. So, I just gave you a little bit of history as to how we came to this issue. And really, the questions that are driving our paper and this symposium presentation are the following: Is a state-provincial framework necessary? Given the complexity of the problem and the reemergence of the problem.

A very, very important question from my perspective is, is it possible? Something else that I should note, neither Irena nor I are interested in navel-gazing. We both are very, very interested in coming up with ideas that have the potential to gain some traction on the ground. And as you'll see by the end of our presentation, there are some very real challenges to putting a state-provincial framework in place, and we'll get to those at the end.

And the third question is, if the state-provincial framework is necessary, and if it's possible, what would that look like? We have a number of different examples

that we could turn to as ideas for a framework, but that is something else that we will touch on later on in the presentation.

So, Irena, take it from here.

DR. IRENA F. CREED: Thanks, Kate, and good morning, everybody. Really pleased to be here. This map is basically showing that harmful algal blooms occur in all five of the Great Lakes. Most of our attention has focused on Lake Erie. But recently, we're seeing harmful algal blooms occurring, even as far north as Lake Superior.

We know that there is a rich diversity of algal species in a harmful algal bloom event, including both native species and invasive ones. And we also know that cyanobacteria are often the dominant in these harmful algal bloom events.

I wanted to show this map, with the yellow dots being those that we know there are algal blooms and the green ones where we know them to be toxic. Remarkably, as I prepared for the paper, I found it very difficult to get data on just where these blooms were occurring. Most of them—especially in the northern Great Lakes—were derived from newspaper articles, and this really spoke to me about the need for greater coordination between our two countries in terms of being able to monitor where these blooms, and where toxic blooms occur. For, if we cannot monitor them and map them, it poses a great challenge for managing them.

On the next slide . . . Kate, can you move the slide forward?

DR. FRIEDMAN: Yep. Hang on. There we go.

DR. CREED: Thank you, Kate. Most of our understanding of harmful algal blooms has occurred due to Lake Erie, and the rich history there of blooms. Lake Erie is a focal point because it's the smallest and shallowest of the Great Lakes, and therefore more vulnerable to these harmful algal bloom events. In the 1970s, it was declared in *Maclean's* magazine that Lake Erie had died due to these rich algal blooms. And, subsequently, a great deal of effort has focused on dealing, or reducing the risk of these algal blooms by focusing on phosphorus.

Phosphorus control has led to a reduction of these algal bloom events, and shortly after, it was considered one of the greatest success stories of bringing back to life Lake Erie.

However, things have changed. And in the 1990s, these harmful algal bloom events have reemerged in Lake Erie, and now they're expanding to and intensifying in the other Great Lakes. Next slide, Kate.

Why is this happening? I decided, in the paper, to focus on where most of our management efforts have been, and that's on phosphorus. And what we know is that there are new sources of phosphorus that were previously unaccounted for, or not considered significant.

The first one is really that phosphorus coming from the land surrounding catchments into the lakes. And what we now know is that there is a significant increase in the proportion of phosphorus load that is in a dissolved and more reactive form, as opposed to the particulate form, in the total phosphorus loads.

Why is this happening? There's a number of ideas, and one of them is related to climate change. Where you have an increased intensity of storm events, that you may actually get more dissolved phosphorus forms that occur on the land, and then

get drained into the surface waters. Other ideas are actually an unintended consequence of what our previous management systems have been. Zero-to-low tillage systems on agricultural fields may have had the unintended consequence of allowing more dissolved forms of phosphorus to occur, and that is something that we are presently doing research on.

But, it's not just the land to water connection that we should be mindful of. There's increasing evidence that there's atmospheric phosphorus deposition occurring. Much of the work from the U.S. in particular has shown that this is a significant source of phosphorus to water bodies. We're still learning what it could be for the Great Lakes.

Also, there are the legacy effects of historical loads of phosphorus to the lake sediments that then become released from the sediments back into the water column.

And then finally, the invasive zebra and quagga mussels, which have basically resulted in a reorganization of the phosphorus within the lake, where it draws the phosphorus from the open waters and from the nearshore areas, and where cyanobacteria can recycle it quickly and therefore bloom.

What's of importance, in terms of the science behind harmful algal blooms, is that we don't really know the relative magnitudes of these pathways or the relative importance of them. And yet, when we look at managing and reducing by 40% the loads to the Great Lakes, there are other sources that we need to be mindful of.

Further, we also need to understand the relative importance of other cofactors in creating a bloom. In particular, here I'm thinking about nitrogen and urea—a form of nitrogen, where cyanobacteria are known to outcompete other algae when urea is present—as well as trace metals. Kate, if you can move the slide forward.

We know the science is progressing, always. We know that there are new sources. But we are also learning that there might be new exposure pathways that place people at risk. For a long time, we've known the consequence to drinking water, and we just have to think about recent newspaper coverage about the millions of dollars that were spent in terms of treating water. In fact, it's ironic to be next to one of the greatest freshwater resources in the world, and yet people having to buy bottled water just to avoid toxins in the water.

More recent evidence is now starting to show that the wave action of large water bodies create aerosols, and that people can inhale toxins through these aerosols.

And finally, emerging evidence showing that these toxins can also pass through food webs. And so, the fishery industry and everything such like that would also be at risk.

The science still needs to progress further. Especially in Canada, we often focus on just microcystin—I believe that's the same in the U.S.—when we think about risk of exposure, especially for people. But we know that there are different forms of microcystin and each of those have different forms of toxicity. But we're now starting to learn that, when you have microcystin, you can also have a cluster of other toxins associated with it that we have not started to really monitor in a very comprehensive way, especially from a regulatory lens.

So, at this point, I'm going to turn it back to Kate.

DR. FRIEDMAN: Thank you, Irena.

So, that was a great summary of the science related to harmful algal blooms. Now, we want to turn to some of the binational legal instruments that are in place to address harmful algal blooms.

Clearly, there are a number of federal, state, provincial, local frameworks, regulations in each country separately to deal with HABs [harmful algal blooms], including hundreds of best management practices. But, for purposes of our paper and this presentation, this symposium, we really are focusing strictly on the binational legal instruments that are in place to help address this problem.

As Governor Blanchard mentioned, the very first legal instrument that was established is the Boundary Waters Treaty that was established back in 1909. A seminal treaty between the United States and Canada, and created the International Joint Commission which, I have to say, although it is sometimes critiqued in Canada-U.S. circles, it truly is held up as a model for the rest of the world as to how two countries could really come together, form an institution, and move forward on transboundary water issues.

Just a couple of things to note with regard to the Boundary Waters Treaty. A foundational principle enshrined in Article IV, one country's pollution shall not harm another country's water body. It's a critical principle that we'll get back to later in thinking about what a sub-federal, binational agreement would look like.

The IJC right now, for the most part, plays a really important role in terms of gathering data, issuing reports, and recommendations. They do a great job convening stakeholders across the basin. And again, another point that we'll get to later—and I know Howard Lerner, who's on the academic and NGO panel later, will point to—there's very little enforcement with regard to the IJC, and quite frankly with regard to many of the instruments that we are going to talk about.

We then turn to the 1972 Great Lakes Water Quality Agreement. Again, another seminal agreement in the history of Canada and the United States was that agreement that is credited with, as Irena mentioned, eliminating point source pollution—sources of phosphorus at “points”—wastewater treatment, industrial sources, *et cetera*.

The Great Lakes Water Quality Agreement has been amended a number of times, and it's really changed the shape of the agreement, the nature of the role of Canada-U.S. cooperation at the federal scale. Very briefly, in 1978, ecosystem management was introduced as a concept in the Great Lakes water quality world. In 1983, there were further commitments by Canada and the United States to reduce phosphorus. 1987 saw the introduction of community participation, LAMPs [Lakewide Action and Management Plans] and RAPs [Remedial Action Plans], and importantly, the creation of a Binational Executive Committee as a mechanism for coordination and collaboration between Canada and the United States. Environment Canada and the U.S. EPA were able to consult directly through this mechanism, and that really was critical—as many governance scholars have pointed out—that was really critical in reorienting work on the Great Lakes away from the International Joint Commission to the federal governments in each country, and has been noted as a significant governance game changer in the history of binational collaboration.

And then, last but not least, we have the 2012 Great Lakes [Water Quality] Protocol, which adopted principles such as adaptive management, continued an ecosystem approach, actually has an entire annex, Annex 4, related to HABs and harmful algal blooms, with a target of 40% reduction in phosphorus and phosphorus loading.

And the protocol established another governance mechanism, the GLEC, the Great Lakes Executive Committee. So, the Binational Executive Committee morphed into the Great Lakes Executive Committee where, arguably, there's more coordination of programs between the federal governments. And there certainly is more stakeholder engagement.

So, moving to the sub-federal level, we have an example of a compact and declaration, the 1955 Great Lakes [Basin] Compact and declaration, which established the Great Lakes Commission, which plays an important role at the sub-federal, state-provincial scale in terms of water quality issues. The Great Lakes Commission fosters dialogue, it gathers data, it shares information. Very much like the IJC, has little enforcement power—can make recommendations and convene folks, but very little enforcement power.

We also have the 2015 [Western Basin of Lake Erie] Collaborative Agreement among Ontario, Ohio, and Michigan. And this agreement was launched at a meeting of the Great Lakes-St. Lawrence Governors and Premiers, which is another entity at the sub-federal level in the Great Lakes region. These two states and the province of Ontario made a bilateral commitment to reducing harmful algal blooms in the western basin of Lake Erie and agreed to reduce phosphorus by 40%.

And so, it was significant because, if you read the terms of that agreement, the parties noted that it was an issue, particularly in the western basin of Lake Erie, that they could not solve individually, right? So, they needed to, you know, put their collective heads together and think more broadly about how they, at the state-provincial level, could get their arms around this problem.

So, as I alluded to earlier, there are several problems, governance challenges, related to these agreements. And they primarily come down to a lack of enforcement and, in some cases, some people would argue, a lack of accountability.

I had the privilege of working with some folks in the State of Wisconsin, in Green Bay—the Alliance for the Great Lakes, Todd Brennan is on the academic/NGO panel—doing great, great work in Green Bay and the Lower Fox River Basin, attempting to get their arms around this problem. And it was in that context where this issue of accountability really came up. It's really hard when you have all of these mechanisms, all of these agreements, all of these actors, where one person or one entity's accountability ends, and where another one begins. And, in some cases, actors are hesitant to step up to the plate and assume accountability for a whole host of reasons.

So, the Boundary Waters Treaty, as I mentioned, is limited as it issues recommendations, it has very little enforcement power—has a lot of heft, think it has a lot of moral authority, but very little enforcement.

The Great Lakes Water Quality Agreement, again, several iterations and there was great, great traction with regard to point source pollution in the 1970s and

early 1980s. But as the subsequent iterations have demonstrated, and including the 2012 protocol, it may not be enough. The challenge is still there and, again, by some accounts, is getting worse. So, it makes me wonder, right? It makes us wonder, maybe the Great Lakes Water Quality [Agreement] framework isn't enough.

The [Great Lakes Basin] Compact and associate declaration with the Canadian provinces, again, is not binding. And, again, the 2015 [Western Basin of Lake Erie] Collaborative Agreement among Michigan, Ohio, and Ontario is very aspirational—has the 40% reduction as a target. But, you know, when you read it, the parties really don't hold anyone's feet to the fire, which seems to be, you know, a recurring theme. A theme that I think that we all know.

So, this is where we get to what Irena and I have been thinking about over the last couple of years: Is a binational, sub-federal approach part of the solution? That's where we're really interested in hearing your feedback and your insights.

On the one hand, it seems as if it really might be a path forward, right? There seems to be a lack of political will at the federal scale under the current presidential administration in the United States. The EPA has been cut. Some, you know, might use stronger language—slash, burned. But there really is not much of an emphasis on environmental issues broadly, or harmful algal bloom specifically, as a priority at the federal level.

I would also venture to say, even if a new administration is elected and we have the Trudeau government in Canada, I suspect—I don't know, and I'd be open to other folks' opinions on this—I suspect that this particular topic may not bubble to the top in terms of priorities, quite simply because both countries are focused on managing COVID-19 right now. And I suspect both countries will focus on restarting the economy's economic growth as soon as the pandemic is brought under control and life as we know it gets "back to normal." So, I'm a little skeptical that the federal governments would step in and elevate this issue as a priority. But, again, I'm open to others' interpretations.

Secondly, you know, a binational, sub-federal approach might be a path forward because, as Governor Blanchard mentioned, state-provincial collaboration is one of the distinguishing features of the Canada-U.S. relationship. States and provinces collaborate and problem-solve all the time, every day. And you can see that in a number of different contexts, including the Great Lakes [-St. Lawrence River Basin Water Resources] Compact on water levels in the Great Lakes. It is a very, very strong example of state-provincial collaboration on a water issue, not water quality issue, but on an issue in the Great Lakes.

So, what would a framework look like? Very, very briefly. You know, we seem to have a couple of options. We could do a compact and an agreement like the Great Lakes [-St. Lawrence River Basin Water Resources] Compact, like the compact concerning water levels, or the 1955 [Great Lakes Basin] Compact. We also could do an agreement like Ontario, Michigan, and Ohio entered into in 2015.

There are strengths and weaknesses associated with both—there are tradeoffs. Obviously, a compact, which has to be entered into by each state and then approved of at the federal government level by Congress, is a little bit of a long haul in terms of a process. And then you have to bring the Canadians in through

an agreement, because a compact is a U.S. state mechanism for allowing states to collaborate—can't enter into a compact at the sub-federal level with Canadian provinces. But, we do have agreements, so you bring the Canadians in through there and that's how to get entire, basin-wide participation. As I mentioned, huge lift, you know, but arguably has more legal heft—certainly has more authority, right? So, that's an option again.

Or an agreement like the two states and the province entered into. Maybe a little less legal or governance heft, but certainly quicker to negotiate and, you know, really can serve an important purpose in terms of information sharing. Which, you know, if you had a spectrum, probably at the lower end of collaboration in terms of these issues. But it's not easy getting there, and I'm a big proponent of starting somewhere. So, information sharing may be a great way to start.

We would also need a steering mechanism, right? So, that could take—and I'm not in favor of creating another organization or creating another institution—many of you in the Great Lakes know, there are I think, I don't know, somebody counted at one point fifty-three various NGOs and actors engaged in Great Lakes issues. Irena and I certainly aren't advocating about creating a new mechanism. But, you know, we have the Great Lakes Commission, we have the Great Lakes [and St. Lawrence] Governors and Premiers. We have two bodies that play a role in this world, in this space and, you know, it's possible that one of them could take on the role of a steering mechanism.

In terms of principles, Noah Hall, who is a prolific professor, scholar in this area, couldn't join us today. But he's been working on . . . actually he couldn't join us because he's working on a case before the U.S. Supreme Court, *Mississippi v. Tennessee*. But in the context of that case, a very important principle has bubbled to the top that I think might be relevant for a state-provincial approach, and that is the doctrine of interstate nuisance. And if you will indulge me for one second, it is a doctrine that, in terms of natural resources that cross state boundaries, you have to balance competing interests in using and preserving these resources, right? So, that's the doctrine of interstate nuisance, which sounds very similar and is, you know, quite analogous to the principle in Article IV of the Boundary Waters Treaty about do no harm, right? So, we have a principle that we could use to guide.

We also would need objectives reflecting science—very, very important. And Irena, you know, presented some of the really great science that is happening in this area. The objectives would have to be reflective of that. And at minimum, all of the actors—the eight states and two provinces—would have to recommit to a 40% reduction in phosphorus loading.

And then very, very importantly is we're learning that engagement of stakeholders is really critical and really important. And so, we would have to have engagement by stakeholders across the spectrum, different sectors, including Indigenous people and Native Americans. A lesson from the water levels compact—those particular groups were not brought in until later. And some folks, some scholars consider it a real mistake, because if they would've been brought in earlier to the process, different ideas could have been brought to the table that would have been reflected in the agreement.

So, that's what a framework would look like.

And just in terms of challenges. I'm not even sure if "humongous" is a real word—and I'm not even sure if that's how you spell it—but it's a humongous lift, right?

(Laughter.)

We recognize that. It would be a humongous lift. There are problems with enforcement, problems with accountability.

And so now I leave it up to the other two panels to help us figure out, what do we do? I mean, it's our intention—it's Irena's intention and my intention—whether or not we agree at the end of the day that a binational, sub-federal framework is the right mechanism for moving forward, this symposium—and again, many thanks to the Canada-U.S. Law Institute—has opened the conversation to this happening at the state-provincial scale. So, thank you very much.

MR. PETRAS: Thank you very much, Kathryn, and thank you very much, Irena, for that outstanding presentation. We greatly appreciate that.

And now we're going to move into our first panel. A couple of words, though. Now's the time to start thinking of your questions. And if you have questions, please put them into the Q&A of this Zoom meeting—not the Chat, but into the Q&A. They're being monitored by Clare Soria, one of our students, and we will collate those and present them as appropriate to the correct individual. We hope we get that right.

Also, I want to point out to everyone that this symposium is being recorded. So, if you do have a question, or if you do make a statement, please do identify yourself. It's our intention to publish the proceedings of this symposium in the *Canada-United States Law Journal*, as well as the paper that's being presented here today by Drs. Friedman and Creed. You should also note that that draft paper has been presented to all our panelists, and they're going to comment on it now. Also, you should note that the final section of that paper has not been written, because they're going to take into consideration these proceedings when they finally draft that and complete the paper.