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Re: Comments on Draft 2023-2025 Great Lakes Binational Priorities for Science and Action

Dear Great Lakes Executive Secretariat,

On behalf of the Great Lakes Ecoregion Network (GLEN), we are submitting these comments on the Canadian and U.S. Governments' Draft 2023-2025 Great Lakes Binational Priorities for Science and Action ("draft priorities"). We appreciate the opportunity to provide input on the important matter of identifying priorities for science and action for the next three-year period of work under the Great Lakes Water Quality Agreement (GLWQA). These priorities are important, given work that remains to be done to improve the conditions of the Great Lakes.

The governments¹ *State of the Great Lakes 2022 Report* states that for six of the ten categories of Great Lakes indicators for which there is an assessment (P. 4) the status is "fair" or "poor." The definitions that the report provides say that "fair" means "Some ecosystem components are in acceptable condition." This means that most components are not in acceptable condition. The report defines "poor" as "Very few or no ecosystem components are in acceptable condition." Even "acceptable conditions" are likely to be far from what we need to achieve for thriving life throughout the Great Lake basin. This is an alarming situation that must drive the work of the Governments over the next three years and beyond.

¹ The terms "governments" and "Parties" are used interchangeably throughout this submission to refer to the Canadian and U.S. Federal Governments.

The governments draft priorities are critically important because, as you say, “They are intended to guide and focus the key activities implemented by Canada and the U.S. from 2023 to 2025” (intro to governments’ public comment draft). Also, these priorities become the basis that the governments will use when preparing their next triennial *Progress Report of the Parties* in 2025.

These are an essential component for government accountability under the GLWQA.

Our review of the draft priorities finds that the proposed actions are basically a continuation of the existing programs under current goals, laws, regulations, and policies. The *State of the Lakes 2022 Report* shows that the existing programs must take important steps forward and that new programs and goals may be needed. As we stated in GLEN’s foundational report, “while we acknowledge incremental progress, we also recognize that incrementalism has failed to protect the Great Lakes and its food web” (*The Great Lakes Water Quality Agreement at Fifty*, September 27, 2022, p. 8).

The remainder of our comments offer recommendations for strengthening the priorities, including through both overarching themes and recommendations specific to each annex.

Overarching Priorities

Broaden possible activities: Taking into account the need for a thriving Great Lakes ecosystem, the governments should make sure they do not limit their priorities to actions that are already covered by existing legislation or programs. There may not be enough time to approve and implement some of the new programs, legislation, etc. between 2023 and 2025. Nevertheless, if we do not make it a priority now to immediately at least start developing and implementing innovative programs, we will fail to adequately improve the state of the Great Lakes.

***Recommendation 1:** The Parties should review their draft priorities to decide which **new** programs, legislation, strategies, etc. should become priorities for action or research.*

Strengthen watershed approach: As explained in comments developed by the Ontario Headwaters Institute, a watershed approach to managing the Great Lakes is essential. See: [Microsoft Word - OHI Science and Action Priorities Oct 31.docx \(ontarioheadwaters.ca\)](#)

Nevertheless, formal reference to watersheds in the draft priorities is limited to discussion regarding Annex 4 addressing excess nearshore nutrients in Lake Ontario. We believe the Parties should be considering the watershed approach in identifying priorities for each annex.

For example, multiple lake impacts result from pressures in the watershed, including the following:

- Agricultural activities related to eutrophication in multiple nearshore areas of the lakes (Annex 4);
- Multiple stressors potentially addressed through Lakewide Action and Management Plans (Annex 2);
- Loss or degradation of upland or wetland habitat with hydrological and other implications (Annex 7).

In addition to more effectively addressing the stressors leading to water quality degradation, a watershed approach provides the potential for increased public engagement to help address the problems.

Recommendation 2: The Parties should specifically include watershed management in several of the annexes, especially annexes 2, 4, and 7.

Extend climate change to multiple annexes: Although climate change is addressed through its own Annex 9, the Parties should also more explicitly note the relevance of climate change in developing priorities to address stressors covered in all other annexes. For example, climate change-induced changes in water levels, watershed hydrology, or temperatures can have multiple implications, including for habitat and species, nutrient transport, and toxic chemical mobilization. We provide more specific comments below in the climate change annex.

Recommendation 3: The Parties should specifically include climate change in their priorities in several annexes beyond Annex 9.

Increase specificity of priorities: The Parties should develop priorities across all annexes that are more specific, and that contain measurable outcomes and timelines. For example, Annex 5 (Discharges from Vessels) lists multiple priorities for action, several of which are relatively specific, whereas for Annex 2 (LAMPs), much of the action emphasis is on updating and publishing of LAMP reports. While reporting is important, we believe it would be more useful to indicate a process by which LAMP priorities are being identified and projects implemented.

Recommendation 4: The Parties should provide more specificity in their targets in many cases and include measurable outcomes and timelines.

Cooperation and Consultation:

Recommendation 5: As required by the GLWQA, the Parties should state that they will develop and carry out the actions and science priorities “in cooperation and consultation with State and Provincial Governments, Tribal Governments, First Nations, Métis, Municipal Governments, watershed management agencies, other local public agencies, and the Public.”

Timing: Throughout the document timing is given for many actions as “by 2023” “by 2024,” etc. This leads to confusion as to whether it means by the beginning of 2023 or by the end of 2023, for example.

Recommendation 6: The Parties should clarify throughout the document whether the dates given as “by” means by the beginning or end of that year.

The remainder of our comments are focused on individual annexes.

Annex 1 (Areas of Concern)

In our survey of some AOCs and in the six webinars that we held between the end of August and mid-September 2022, we heard substantial concern about “life after delisting” from both those still designated as AOCs and those from AOCs that have been delisted. Their major concern was that, after having spent so much time and dollars to restore and delist AOCs, new problems may arise or old problems may recur.

Recommendation 7: Addition to Action Priorities

By the end of 2023, the Parties should prepare and commit to a “life after delisting” strategy and policy to ensure ongoing work and support for AOCs after they have been delisted. This strategy should include at a minimum:

- *Funding for citizen and local government oversight and monitoring to protect and continue ecosystem quality gains made under the RAPs and to foresee new threats to the area and a commitment to act on such threats immediately to avoid degradation of the former AOC.*
- *Designation of responsibility and accountability for continued oversight and monitoring.*
- *Requirements for and enforcement of policies on redevelopment of remediated areas to ensure physical, chemical and biological integrities are not lost due to urbanization, re-industrialization, fragmentation and loss of habitat, etc.*

By the end of 2024, the Parties should implement the “life after delisting” strategy in the AOCs that have already been delisted, and in those that are still listed as AOCs.

Recommendation 8: Addition to Action Priorities

The Parties should clarify in their Action recommendations whether there is a distinction between the U.S. commitment to “remove BUIs”, and Canada’s commitment to “restore BUIs”.

Recommendation 9: Addition to Science Priorities

The Parties should develop and support a climate change adaptation plan for the Great Lakes ecoregion particularly relevant to AOCs. This should include factors such as possible water level changes, shoreline instability, warmer waters, and invasive species spread, all of which can undermine ecological integrity. The planning should also evaluate current widespread remedial engineering practices such as placing dredge spoils in shoreline disposal facilities, which are vulnerable to more severe storms, flooding and seiches.

Recommendation 10: Clarification to Science Priorities

The Parties should explain how those particular AOC/BUI combinations were identified for monitoring.

Annex 2 (Lakewide Management)

The LAMP program is a challenging, ambitious and potentially innovative program, which has much room for improvement. But the draft priorities for science and action are very weak. As we stated earlier, basically all of them are continuations of items in the cycles that have been set up for LAMPs: monitoring in preparation for the next update and publishing of the Lakewide Action and Management Plan, and continuing to implement LAMPs. This implies that no improvements need to be made in the LAMP program, except in public engagement where the phrase “enhance” is used.

Certainly, the latter is an important need, as the IJC made enhancement of public engagement in LAMPs as one of its three recommendations in its *2020 Second Triennial Assessment of Progress Report*.

In 2021 and 2022, the members of Annex 2’s Extended sub-committee, which is made up primarily of government agencies who work in the LAMP program, brought forward 30 ideas for improvement in the program and for new areas for exploration to support that improvement. Even though these were given to those developing the priorities for action and science to consider, none of them appear on the draft priorities for Annex 2, except for enhancing public engagement. (E-mail sent by Steve Clement [ECCC] on behalf of Annex 2 co-chairs Sean Backus [ECCC] and James Schardt [US EPA] to 56 members of Annex 2, Extended Subcommittee, April 8, 2022).

In our submission we have already said that watershed management innovations need to be added and that climate change needs to be integrated into the LAMP program. We have also made reference to watershed planning as appropriate for individual stressors.

In addition, the LAMPs should explore the development of conceptual frameworks to better tie management actions to ecological outcomes (e.g., Murray et al., 2019. *Conceptual frameworks and Great Lakes restoration and protection: A white paper*, National Wildlife Federation, Great Lakes Regional Center, Ann Arbor, MI). This approach is something that could be noted generally as one component involving management actions and priorities across all LAMPs, which is also related to identifying science priorities concerning further modeling or monitoring work that may be needed to support more effective management actions.

Recommendation 11: Addition to Action Priorities

The Parties should add some Great Lakes-wide items to their LAMP priorities, such as increased understanding and guidelines for climate change, watershed planning, new conceptual frameworks and some items based on input already received from the Annex 2 Extended sub-committee.

Recommendation 12: Revision of Action Item on Implementation of LAMPs

The Parties should be more explicit in stating which are their priority actions for each LAMP, instead of simply saying “Implement actions identified in existing LAMPs.”

Annex 3 (Chemicals of Mutual Concern)

The draft priorities have a significant emphasis on existing chemicals of mutual concern (CMCs) and review of two substances as potential CMCs. We have several recommendations for strengthening priorities under Annex 3, including three under actions, as follows.

Recommendation 13: Add to Action Priorities

The Parties should explicitly note “virtual elimination” as the prime strategic objective for many types of substances and the priorities should include development of a virtual elimination strategy by the end of 2023 and have applied it to all Binational Strategies for Chemicals of Mutual Concern by the end of 2025. The strategy should not be limited by existing legislation, policies, etc. in the two countries if additional measures are needed to achieve virtual elimination.

Recommendation 14: Add to Action Priorities

The Parties should complete their review of sulphates as a potential CMC by the end of 2023.

Recommendation 15: Add to Action Priorities

The Parties should develop a binational strategy by the end of 2025 to reduce and ultimately eliminate the need for fish consumption advisories in the Great Lakes basin. As an interim measure, the Parties should explore further coordination on development of common protocols for fish consumption advisories, drawing on work to date regarding PCBs and perfluoro-octane sulfonate (PFOS), including providing resources to any existing or new initiative to advance this work. In addition to this research and assessment work, the Parties should determine needs at the state and provincial levels for any additional guidance on education and outreach concerning current fish consumption advisories.

Recommendation 16: Add to Science Priorities

The Parties should develop a process for identifying and prioritizing chemicals of emerging concern (CECs) not yet identified as CMCs. Furthermore, monitoring and surveillance work should continue for existing CMCs, chemicals so designated in the next triennial period, and other priority CECs of concern.

Recommendation 17: Add to Science Priorities

The Parties should support increased research on CMCs and CECs in consumer and industrial products, including amending existing binational strategies as needed to increase attention to product-related releases.

Recommendation 18: Add to Science Priorities

The Parties should develop a research program to increase understanding of microplastics in the Great Lakes environment, including related to sources, ecological and human health threats, and improved management approaches.

Recommendation 19: Add to Science and Action Priorities

The Parties should conduct research on and take action on matters such as the mining boom.

Annex 4 (Nutrients)

The 2022 *Progress Report of the Parties* states that, between 2015 and 2020, phosphorus reductions in the US were over 3 million pounds (1,361 tonnes) and, in Canada over 20 tonnes. However, harmful algal blooms persist in Lake Erie, and we have made only limited progress towards the 40% reduction targets for total phosphorus and dissolved reactive phosphorus.

While there have been phosphorus reductions from wastewater treatment plants and other point sources, evidence indicates manure application has increased substantially in the western basin of Lake Erie. The Ohio Department of Agriculture states that there has been an 88% increase in the number of animal units between 2002 and 2017 (and thus untreated manure land applications) offsetting decreases in commercial fertilizer over that period. Furthermore, best management practices (BMPs) are not achieving the reductions needed.

For these reasons, we believe nutrient reductions are not on track to address harmful algal blooms in Lake Erie. Furthermore, we are concerned about continuing harmful algal blooms in Saginaw Bay, Green Bay, and other areas of the Great Lakes, as well as ongoing issues with nuisance algae (*Cladophora*) along many shorelines.

We therefore recommend you strengthen priorities for Lake Erie under Annex 4 as follows:

Recommendation 20: Add to Science Priorities

Use the Ontario phosphorus assessment (as discussed in the 2022 PROP) for all the Great Lakes, including collection of phosphorus data (including DRP) in connecting waterways of all the Great Lakes and reassessing phosphorus targets under Annex 4 for each lake.

Recommendation 21: Add to Action Priorities

Change Annex 4 goals to emphasize phosphorus source reduction in the watershed, rather than managing phosphorus after it is in the watershed, which would ultimately lead to reductions in both total phosphorus and DRP entering Lake Erie.

Recommendation 22: Add to Action Priorities

Determine and report on the amounts of commercial fertilizer phosphorus and manure phosphorus being applied in the western and central basin watersheds of Lake Erie on an annual basis, as well as the number and size of large and medium (as defined by USEPA) confined animal feeding operations over time in these same watersheds.

Concerning science priorities, we support improved tracking and reporting of phosphorus loads and harmful algal blooms in Lake Erie, although we note the Parties should consider using something similar to the National Oceanic and Atmospheric Administration cyanobacterial index in reporting on bloom extent/severity, in annual tracking and triennial reporting. We also support further edge-of-field studies, though note there should be consideration of a broader suite of approaches to reducing phosphorus export (e.g., nutrient management – including avoiding fertilizer use when not needed), rather than just controlling and trapping.

Finally, it is important to recognize that knowledge gained in the Lake Erie basin (including through efforts noted above) could be applied to addressing similar issues elsewhere in the Great Lakes basin, including harmful algal blooms and other eutrophication problems in Green Bay, Saginaw Bay, Duluth-Superior Harbor, nearshore areas of Georgian Bay and Lake Ontario, and in other nearshore areas.

Recommendation 23: Add to Action Priorities:

The Parties should develop revised nutrient loading targets for Lake Ontario, while taking account of current understanding of the importance of reducing nearshore nutrient concentrations while not exacerbating problems with low nutrients in offshore waters.

Recommendation 24: Add to Science Priorities:

The Parties should by 2024 develop a plan to address eutrophication problems in other nearshore areas of the Great Lakes, including Green Bay, Saginaw Bay, and other embayments where harmful algal blooms or other symptoms of eutrophication have recently occurred.

Annex 5 (Discharges from Vessels)

We appreciate the greater detail regarding specific programs or efforts noted in addressing discharges from vessels in comparison with the level of detail in some annexes. On action priorities, we appreciate in particular the reference to developing common implementation approaches between the two countries in implementing ballast water requirements, in addition to carrying out consistent and compatible compliance monitoring.

Regarding science priorities, we are particularly supportive of the need for additional research on technical challenges to the use of ballast water management systems.

Annex 6 (Aquatic Invasive Species)

In general, we support the draft priorities for addressing aquatic invasive species (AIS) through Annex 6, though we believe further specificity is needed. For example, while it is important to prevent introduction of bighead, silver, black carp and other invasive fish species, it would be more helpful to note key vectors of concern, including for example ongoing or needed work in the Chicago Sanitary and Ship Canal and other waterways.

The approach of early detection and rapid response is also critical concerning new AIS, but it would be more helpful if work through one or more specific programs could be identified here. In particular, it would be helpful to know of any systematic risk assessment efforts underway, drawing on work that has been carried out over the past two decades.

Recommendation 25: Change needed in Draft Priorities

The Parties should put more detail into the draft actions, especially those described in the previous two paragraphs.

Recommendation 26: Addition to Research Priorities

The Parties should explore how community science and/or public involvement can contribute to early detection and rapid response efforts and develop programs to support these citizen roles.

We also support reference to carrying out a gap analysis concerning programs addressing AIS in the Great Lakes basin.

While preventing new AIS is critically important, it is also important to advance efforts to control, and where possible, eradicate AIS that are already in the Great Lakes. This can include, for example, expanded efforts to control grass carp, and identification and implementation of any mitigation options for invasive mussels (e.g., quagga mussels).

Annex 7 (Habitat and Species)

We believe there is a need for more specific priorities on actions and science work under Annex 7. For actions, given the diversity of habitat types and species in the Great Lakes, even along the shoreline, it would be helpful to have a better sense of priorities for restoration and protection work. Even in the case of coastal wetlands restoration, it would be preferable for the Parties to identify (even at a high level) areas of focus, including for example heavily altered shorelines along the Huron-Erie Corridor and western Lake Erie.

It would be helpful to have more details on work planned over the triennial period, including related to the scale of assessment (basin-wide or more lake or sub-basin focused), and the extent to which coastal wetland restoration is being tracked via indicators (both concerning extent and condition).

Recommendation 27: Change needed in Draft Priorities

The Parties should put more detail into its draft priorities, especially those described in the previous two paragraphs.

Recommendation 28: Addition to Action Priorities

The Parties should integrate into this annex's priorities stressors addressed in other annexes (e.g., toxic chemicals, excessive nutrients, aquatic invasive species, and climate change), to ensure protection and restoration of particular habitats and species. This should include attention to stressors with multiple potential impacts (e.g., net pen aquaculture).

Concerning science priorities, we appreciate the inclusion of ongoing support for Great Lakes Coastal Wetland Monitoring Program (U.S.) and the Canadian Coastal Baseline Habitat Survey.

Finally, as noted in our overarching comments, it is important for restoration work (including in this case for habitat and species) to be occurring up in the watershed, both in its own right and for benefits accruing downstream, including in the lakes.

Recommendation 29: Addition to Priorities

The Parties should use a full watershed approach in this annex reaching all the way from the lake up the watershed to its headwaters.

Annex 8 (Groundwater)

All annexes should have both science and action priorities. The Parties should determine an action priority needed to address groundwater in the Great Lakes, based on current understanding of the surface-groundwater linkages and various stressors in the Great Lakes. The Parties should draw on the review and recommendations in the recent International Joint Commission (IJC) report *Development of a Great Lakes Groundwater and Surface Water Conceptual Framework* (<https://ijc.org/en/sab/groundwater-surface-water-framework>), which can inform next steps of the Parties in addressing groundwater issues in the basin.

Recommendation 30: Addition of Action Priorities

The Parties should commit to action priorities to be carried out under this annex in the next three years.

Annex 9 (Climate Change)

Concerning the governments' first science priority on LAMPs, while the LAMPs need to be informed by climate change, they may not be the most effective or timely vehicle to address climate change concerns in the Great Lakes. Moreover, given the urgent narrow time window (perhaps eight years at most) to avoid catastrophic damage from climate change, and increased frequency and severity of storm events in the region, the "one lake per year" approach (in particular as carried out through the Cooperative Science and Monitoring Initiative program noted in Annex 10) is insufficiently responsive to the climate timeline, and inadequate to engage regional players in *cohesive regional strategies*.

Recommendation 31: Revise Science Priority

The Parties should expand the research focus to include multi-lake and system-wide assessments on how the changing conditions in the lake ecosystem will affect water quality, temperature, biological life, lake levels, coastal wetlands, and human health and commerce.

The governments' action priorities are focused on fostering and enhancing knowledge exchange on Great Lakes science (including modeling). Knowledge without action will remain largely academic. We will always need to stay on top of research in this field, but we urgently need to move from "informing" to discussion to drive responsive action.

We need to better engage state, provincial, federal, and Indigenous decision-makers in responsive climate action that will support Great Lakes resilience and adaptation, and to increase awareness of which agencies are undertaking work where the findings are relevant and have applications. Dialogue among these leaders will also identify gaps that are preventing decision-makers from using findings. We are concerned that many local actions are now taking place outside of the context of the whole Great Lakes, but cumulatively, these actions may help or hurt overall Great Lakes resilience.

Recommendation 32: Addition to Science and Action Priorities

The Parties should also focus on developing strategies and sharing information on actions that can be taken to address climate change impacts. These should include:

- *Engage a wider audience with whom the Annex team shares findings, including state, provincial, regional, federal, Tribal and First Nations agencies engaged in mitigation, resilience, or adaptation strategies.*
- *Identify the status of current state, provincial and federal climate response actions that will influence Great Lakes water quality, habitat, commerce, and recreation, ranging from wetlands restoration to flood and erosion management plans (some communities are hardening shorelines, for example).*
- *Develop community guidance about practices that help and practices that harm the Great Lakes, and flag how local actions may have lake-wide implications.*
- *Foster dialogue and strategies among decision-makers and implementers who are currently undertaking mitigation, adaptation, and resilience actions and planning in the Great Lakes region.*

In 2019 the Great Lakes Water Quality Board urged that the region convene a "network of networks" to coordinate action for a Great Lakes climate response. (See summary report: https://ijc.org/sites/default/files/2019-11/WQB_ClimateAdaptationandResilience_Sept2019.pdf.) To the best of our knowledge, the Parties have taken no steps in that direction, nor has any other Great Lakes body.

Recommendation 33: Additional Priorities

The Parties should set as a priority to increase coordination and support research and action on climate change matters. To achieve this, the Parties should:

- *Establish by the end of 2023 a Great Lakes Climate Coordination Council, working with other Great Lakes bodies such as the International Joint Commission, the Great Lakes Fishery Commission, the Great Lakes Commission, the Great Lakes Indian Fish & Wildlife Commission, the Great Lakes Executive Committee, the Great Lakes & St. Lawrence Cities Initiative, and NOAA's Great Lakes Regional Collaboration Team, and other relevant regional bodies.*

- *Periodically convene the decision-makers and implementers who are currently undertaking mitigation, adaptation, and resilience actions and planning in the Great Lakes region, through webinar briefings/workshops (related to new findings and emerging issues) and an annual “Great Lakes Climate Science and its Applications” workshop.*
- *Share trends in projected impacts that shed light on the chemical, physical and biological quality of the lake ecosystems, their ecological resilience, and changes with time, including providing information on emerging “red-flag” climate trends.*
- *In consultation with the IJC, identify priority threats and concerns that will require cross-border strategies, and communicate those priorities to the Great Lakes Climate Council and relevant public agencies and constituencies.*

Annex 10 (Science)

Concerning science priorities within Annex 10, the Parties emphasize work through the Cooperative Science and Monitoring Initiative (CSMI) program. While the CSMI program is important, it is also important to address multiple issues, including issues that may be of relevance across the Great Lakes basin (and not specific to one lake, as addressed in any given year through the CSMI program). Priorities here could reference the importance of horizon scanning for potential new threats to the Great Lakes, as discussed in recent efforts of the IJC regarding a Great Lakes Early Warning System. In addition, the Parties should note the importance of social science and economics research, and its value in addressing multiple stressors affecting the lakes. Promoting such research (including through new programs) could be considered an action priority.

Recommendation 34: Refined Priority for Science

The Parties’ priorities for science should address multiple stressors affecting the lakes, increase attention to horizon scanning/early warning systems, and increase social science and economics research related to better implementing programs to protect and restore the Great Lakes.

In addition, we support increased reference to and use of Traditional Ecological Knowledge (TEK) in understanding and managing stressors in the Great Lakes. We believe work of the Parties involving TEK should expand. In addition to updating the recent TEK guidance document, this work should include developing more formal programs integrating TEK and western science at various scales and involving multiple stressors, through collaboration with Tribes, First Nations, and Métis in the basin.

Recommendation 35: Expand Action Priority on TEK

The Parties should expand this priority for action beyond updating the recent TEK guidance document to more systematically integrating TEK and western science through multiple collaborative efforts.

Finally, the Parties, in working with states, provinces, and Indigenous communities should explore ways to better integrate increasing community science efforts into monitoring and other programs, through organization of new partnerships, development of guidance documents, and provision of resources to community groups and others engaged in community science efforts throughout the basin. This work should include efforts and resources to increase engagement with communities of color and low-income communities throughout the basin.

Recommendation 36: Addition to Action Priorities

The Parties should provide resources to advance community science initiatives throughout the basin (including for communities of color and low-income communities), and identify opportunities to integrate results from such initiatives into monitoring and reporting programs.

In conclusion, we believe the Parties should keep in mind the high-level principles guiding work under the GLWQA, including on taking preventive actions and using a precautionary approach. We appreciate the opportunity to provide these recommendations for improving the Draft 2023-2025 Great Lakes Binational Priorities for Science and Action. We would be happy to meet with you to discuss these recommendations in further detail. Thank you for your consideration.

Sincerely,



**John Jackson, President
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