



Conservation Ontario February 26th, 2021 Comments **“Toward the Creation of a Canada Water Agency” Discussion Paper**

Section 3.1 Freshwater Objectives

A: What are your thoughts on the above objectives?

The objectives are all good high-level objectives that relate to many major issues in freshwater management in Canada. Providing a plan and ambitious timeline to achieve the objectives will be challenging and better supported through more specific, actionable, relevant, measurable and timely objectives (i.e. SMART objectives).

B: Which objectives are a priority for you?

1. Data and information are available to support informed freshwater decision-making at all levels.
2. Canada has a state of the art prediction system for floods and droughts that informs climate change adaptation and disaster risk reduction
3. Canada has and applies cutting edge science to tackle the freshwater challenges of the next century, including climate change.
4. Federal policies promote effective management and protection of freshwater resources and ecosystems in Canada for 21st century challenges and beyond— including adapting to climate change.
5. Canadians are actively engaged in managing and protecting fresh water.
6. Collaborative arrangements are in place and support effective management of domestic and Canada-U.S. transboundary fresh waters

C: Are any objectives missing?

Conservation Ontario respectfully suggests that the following objectives are missing from those listed in the discussion paper, and would present a valuable contribution to the overarching freshwater management objectives for the federal government:

- Objective related to clarifying the roles and responsibilities of Federal, Provincial, Watershed and Regional agencies / actors. Roles and responsibilities should be described and based-on the premise of adaptive management at the watershed level.
- Objective related to referencing the ecosystem service value of freshwater and recognition of the financial valuation of this natural asset in federal government accounting and reporting. Providing clear direction and communication on the economic value of this natural asset will help to build the business case for increased freshwater management and protection in Canada.

- Objective related to freshwater management and human health (e.g. drinking water) in general. Although the federal government has a previously stated objective to ensure First Nations have access to safe, clean drinking water, the overall maintenance of clean and safe sustainable drinking water sources was notably absent in the listed objectives. This additional objective will be useful in addressing concerns or conflicts relating to water use in Canada, and will complement the government’s identified objective related to providing safe and clean drinking water to First Nations.
- Objective related to opportunities to support increased investment in freshwater management implementation actions/efforts by all sectors, particularly those environmental and natural resource agencies which are under-resourced. Additional resource support is required for many “on-the-ground” agencies to undertake work to effectively address current issues (e.g. targeted phosphorus reduction in Lake Erie, reduction of widespread pollution from wastewater and storm water (municipal, industrial and agricultural) systems in developed and developing aquifers and watersheds).
- Objective related to federal leadership in creating or promoting the baseline data that will be required to ensure environmental sustainability and effective management of the water resource system (e.g. wetland inventories and mapping, watercourse mapping, land-use mapping, etc.). As part of this proposed objective, the federal government should directly support the characterization of developing and developed watershed hydrology, such that critical hydrologic features and functions are identified so they may be protected or restored.

Section 3.2 Freshwater Policy, Coordination and Multilateral Engagement

A: What are your thoughts on the current level of federal engagement on freshwater issues with others in Canada? How can the federal government support engagement?

The current level of federal engagement directly with conservation authorities in Ontario is positive in some regards, though it is noted that this engagement is often limited to specific Committees and programs, which may result in missed opportunities for information sharing and collaboration on other areas of freshwater management. For example, the Great Lakes Water Quality Agreement Executive Committee structure and the Annex Committees is a current example of coordination between the federal government and CAs, including the important Great Lakes incentive funding that is used to implement “on-the-ground” actions to support freshwater management in Canada. An additional positive example is the Great Lakes Adaptive Management Committee for the International Joint Commission which is premised on multi-level coordination/collaboration with Environment Climate Change Canada staff. Through this Committee, the ECCC has been supportive through the provision of tools and information related to Great Lakes water levels and coastal flooding and associated issues. Having a bi-national agency and federal partners work to clarify their science for local residents is an important role. It is noted that although this is a positive example of engagement and collaboration, support for resilience notably falls short of what is undertaken in the U.S. (e.g. NOAA, USGS), which provides technical guidelines, training and support for Great Lakes coastal adaptation and resilience.

Other examples of federal engagement include:

1. Partnerships with CAs in monitoring where federal standards and protocols are utilized (e.g. coastal wetlands – ECCC).
2. Partnerships with CAs in the development of watershed-based Fisheries Management Plans where engagement took place with stakeholders, including the DFO and MNR.

3. Coordinated protocols for response to enforcement issues involving the federal *Fisheries Act* and *Conservation Authorities Act*.
4. Advice provided to CAs from the Canadian Geological Survey's groundwater experts.

Actively enabling the transfer of knowledge through training and development of tools for practitioners, coupled with funding incentives for implementation, would allow the federal Canada Water Agency to effectively leverage the expertise and reach of various levels of government, agencies and actors across Canada to address local and regional freshwater management needs. Additionally, there are many federal programs or requirements that connect to freshwater management (e.g. fish habitat, federal harbours), so building federal capacity to be accessible and responsive to local needs/issues will help support long-term engagement. Finally, guidelines and financial support when the Duty To Consult is triggered on freshwater issues would further support engagement from all parties.

Overall, while CAs do experience positive engagement from the federal government on freshwater issues in some regards, there continues to be limited engagement in the watershed planning and management work of CAs and the lack of a clear National Water Policy has compelled some of the provinces and territories to develop their own freshwater policies or strategies. Clear federal policies, standards and protocols for freshwater protection and management would further support multi-scale coordinated action and engagement across Canada.

Lastly, it is important that the Federal government not lose sight of providing sufficient resources to implement policies and legislation which already exists. For example, cuts to DFO under the previous government has meant that fewer DFO staff are available to deal with enforcement issues and review of plans for in-water works, particularly in inland systems. Those staff who are available to deal with such matters are often located in a different part of the country, and lack the local knowledge necessary to make local decisions.

B: How should federal, provincial, territorial, municipal, and Indigenous governments work together to coordinate efforts and cooperatively address local and regional freshwater issues?

Currently, federal engagement is limited to areas of federal jurisdiction, which does not encompass all parts of the water resource system. To ensure all levels of government are working together to coordinate efforts and cooperatively address local and regional freshwater issues, there are a number of roles the federal government can take to facilitate this collaborative approach. Primarily, there needs to be a common understanding of the geographic framework which is being used to manage freshwater resources. The federal government is encouraged to work with all levels of government and watershed management agencies to define local and regional scales, based on watersheds, subwatersheds, and catchment basis as the ecosystem-based framework for managing freshwater. Annex 1 in the Discussion Paper provides this information at the federal level. Secondly, the federal government, through the Canada Water Agency, should provide the policy framework, data, and facilitation of expertise that provinces can then use and apply at the watershed scale to manage and protect freshwater systems; these need to be developed collaboratively with all concerned. In order to coordinate work that addresses specific freshwater issues across all levels of government throughout Canada, the CWA should mandate, establish and facilitate thematic working groups. See Response to Question 4.0 (a) for more details and examples. Outside of these working groups, it would be appreciated if there could be increased engagement from federal department staff who work at the regional level with local levels of government and watershed management agencies. Without a conduit for local/regional level

engagement with the federal government, it is difficult to bring high-level federal direction down to the local implementation level.

Furthermore, Conservation Ontario notes that one of the larger barriers to achieving effective coordination of efforts and cooperation amongst all levels of government is due to a lack of understanding of responsibilities to address freshwater management issues where there is overlap between the levels of government. As a result, collaboration between the levels of government becomes difficult, as some levels may be wary to share data/information to support the works/responsibilities of others. For example, conservation authorities have experienced difficulties with federal and provincial agencies sharing information. Data which is collected by agencies such as Parks Canada is not openly shared with other agencies, such as the Ontario Ministry of Natural Resources and Forestry or CAs. Facilitating a greater sharing of data would greatly benefit the works of CAs in protecting public safety and flood forecasting, and should be encouraged to cooperatively address local and regional freshwater issues.

In addition, part of Parks Canada's mandate is to manage a number of recreational canal systems. As these systems were designed to allow watercraft to pass between drainage basins, they also represent a potential vector for the spread of aquatic invasive species. A more coordinated approach between Parks Canada, municipalities, local watershed management agencies, and provincial governments would help manage the further spread of aquatic invasive species across drainage divides.

Lastly, to facilitate the coordination of efforts and cooperatively address local and regional freshwater issues, additional funding is needed, particularly at the local/regional implementation level. One potential solution is to modify the terms of grant programs, where possible, so that funding can be more easily leveraged between different programs for a single project that benefits multiple levels of government. Presently, "stacking rules" between different federal grant programs limits the total amount that can be leveraged, which may exclude some higher-value projects from being undertaken, even though they have benefits across multiple sectors / levels of government. As an example, a wastewater treatment plant upgrade may be a candidate for funding through the Clean Water and Wastewater Program with Infrastructure Canada. Such a project could also have benefits to fisheries; however, presently it is difficult to pursue funding from DFO and Infrastructure Canada for the same project, even though it benefits both.

C: How should the federal government support freshwater-related international activities?

The federal government is encouraged to share / engage in an exchange of knowledge, technologies, experiences and best management practices with other countries close to the size, environmental condition and similar in principles to Canada. In doing so, the federal government is encouraged to leverage the knowledge and expertise of various levels of government, as well as relevant agencies/actors to share experiences and knowledge which support various scale and actions related to freshwater management. For instance, many CAs have engaged with organizations / governments internationally to share watershed management expertise, and have been recognized internationally for their works.

Further, when considering allocation of funding to levels of government and other agencies involved in freshwater management, the federal government should consider allocating funding geared at

protecting and improving freshwater trans-boundary basins (for example, both inland and along the shores of the Great Lakes and the St. Lawrence River).

Section 3.3 Freshwater Prediction to Inform Climate Change Adaptation and Disaster Risk Reduction

A: What scale and geographic precision of modelling output is needed to support your decision-making and how do you see this evolving over the next decade?

Conservation Ontario is pleased to see the possible opportunities for federal leadership to support this goal, including the development and implementation of a national coordinated observation, modelling and prediction framework to support the information needs of regional and local decision-making. Ultimately, well-researched and consistently adopted methodologies are needed to increase certainty and confidence in climate change modeling across Canada.

In order to accurately inform decision-making at the local/regional level with respect to climate change modelling, there is a need for robust, down-scaled ensemble models that include as many regional models as possible to truly capture unique local level influences. To support the work of conservation authorities, watershed and subwatershed scale modelling, as well as cumulative impact assessments are increasingly important to inform decision-making. The level of accuracy included in these regional/local models is critical, for example: developing regional IDF curves and protecting current and future municipal infrastructure, or undertaking regionally based natural heritage vulnerability assessments. As the impacts from climate change accelerate, this local-level precision will be increasingly critical.

Many CAs have localized monitoring programs and/or have localized knowledge that can enhance modelling predictions and may provide support for watershed decision-making to municipalities. The Federal government, in partnership with other levels of government (provincial, municipal) is encouraged to seek opportunities to support / enhance the abilities of CAs to undertake such monitoring and research to develop more accurate local/regional decision-making.

B: What are your needs for water quantity prediction products, services, and applications?

Conservation Ontario offers the following summary of water quantity prediction products, services, approaches and applications which are needed to support the work of conservation authorities in Ontario:

1. As previously mentioned, **consistent** water quantity prediction products and climate change prediction models. Consistency in modelling approaches is particularly important, as there is often inconsistencies in the modelling used across multiple levels of government, which may lead to duplication of effort. Some specific examples of water quantity prediction products, services and applications which are needed include: LiDAR data, climate station telemetry, drone footage of flooding events, surveys of peak event extents, and more.
2. More robust/fulsome water monitoring networks and/or additional funding to expand monitoring efforts (e.g. water-levels, flow gauges, etc.). Expensive cost-share models between federal departments (e.g. Parks Canada) for monitoring data through agreements with the Province only allow limited access to water level data for other agencies (such as CAs).
3. Coordination of approaches for floodplain mapping, flood forecasting and flood mitigation. This may include: access to current and historic datasets, providing guidelines to incorporate climate change considerations into existing models, higher resolution and technically defensible

floodplain mapping (e.g., at the watershed/subwatershed scale), and predictive forecasting data and models. As areas urbanize throughout Canada, higher resolution flood mapping and predictive forecasts for public safety are needed.

4. Calibrated and integrated groundwater and surface water modelling for all agencies / levels of government. For CAs, there is a need to be able to assess cumulative impacts from multiple sources (for instance, urbanizations as well as climate change).
5. Improved management practices on watershed flood control reservoirs that optimize water quality while maintaining critical reservoir functions.

C: Which of your needs are or are not being met now? How do you see your needs evolving over the next 10 years?

Over the next 10 years, it is anticipated that government and agency needs will evolve largely due to climate change-related impacts. As these impacts accelerate, improvements in the level of accuracy of data, mapping and modelling will be critical in order to protect freshwater resources, as well as current and future municipal infrastructure. For agencies such as CAs who maintain and operate critical water and erosion control infrastructure, needs may include developing, updating or optimizing structure operation and maintenance plans, as appropriate, to consider environmental needs and climate change while still maintaining flood control benefits, using modelling tools developed to assess flood risk and climate change impacts.

Further, the CWA is encouraged to endorse a consistent climate change model to generate data for input to water budget modelling within each jurisdiction and modelling for coastal resilience. Such an approach will help facilitate future planning actions to prepare for and mitigate impacts related to climate change. In addition to modelling, accessible tools that are endorsed/supported by the CWA are required (e.g., training, trouble shooting, data input, etc.).

A summary of current and future needs is provided in response to Section 3.3, Question B.

Section 3.4 Indigenous Peoples and Freshwater Management

A: From the perspective of Indigenous peoples, what concerns, gaps or opportunities related to fresh water should be taken into consideration when establishing the mandate of the CWA?

Generally Conservation Ontario is supportive of the opportunities presented in the document. Conservation authorities and Conservation Ontario are increasingly engaging with Indigenous Peoples and Communities. Respectful that priority should be placed on Indigenous input to this section, we are providing some perspectives gleaned from some of our local collaborations for consideration. There is value in the community at large understanding the Indigenous perspective on freshwater management. It is a significant opportunity to learn from historic observations and stories that provide a different perspective on the local ecosystem.

Specific examples of concerns, gaps and opportunities gleaned from local initiatives:

- a) As an immediate priority, CWA should take action to prioritize Canada's commitment to addressing proper drinking water for all indigenous communities to the standard expected and provided to all people in Canada. In Ontario some local Source Water Protection programs have established good information sharing opportunities with local First Nations

and Métis groups, however a lack of provincial/federal funding and technical support for these groups has limited the level of engagement and possibilities for collaboration.

- b) Increase capacity in First Nations for positions related to freshwater issues and engagement by providing long term, sustainable funding. Offer volunteer and paid opportunities to build capacity and interest
- c) Ensure that there is appropriate consideration for timing of projects and processes
- d) Create an ethical space where western science and traditional knowledge are considered equally
- e) Consider developing a “Spirit of the Water” Treaty to govern interactions with the water
- f) Consider giving personhood rights to the river
- g) Gather stories of spiritual connections to water, as well as biology and ecology of the water
- h) Meet with Elders and Youth
- i) Women are caregivers / stewards of water. How will this be acknowledged?

B: What are some positive examples of First Nations, Métis, and Inuit participation in freshwater governance and decision-making? How might the CWA present an opportunity for better freshwater management informed by these examples?

Conservation Ontario offers the following positive examples of First Nation, and Métis participation in freshwater governance:

- Participation in Source Protection Committees: Throughout Ontario, some local Source Water Protection programs have established positive information sharing opportunities with local First Nation and Métis groups. In some cases, First Nations committee members have been able to participate as active members on local Source Protection Committees and have established community-based source water protection plans. However, it is noted that a lack of provincial/federal funding and technical support for these groups has limited the level of engagement and opportunities for collaboration.
- Wild Rice Harvesting Committee: This Committee was established to provide for Indigenous review of development and aquatic plant control permit applications on the Trent-Severn Waterway to mitigate impacts to, among other things, aquatic plants that are culturally important.
- Thames River Clear Water Revival (TRCWR): The TRCWR is a long-term partnership committed to a healthy and vital Thames River, which brings together all levels of government, CAs, First Nations and local community members. Perspectives and stories of First Nations with respect to their history, knowledge and identity through Aboriginal Traditional Knowledge (ATK) as it relates to the Thames River are important contributions to the goal of the TRCWR. The TRCWR Steering Committee and First Nations Engagement Committee currently include multiple representatives from First Nation community members.
- Conservation Ontario, Lower Thames Valley CA and Cambium Indigenous Professional Services Partnerships: Conservation Ontario and the Lower Thames Valley Conservation Authority (LTVCA) are collaborating with Cambium Indigenous Professional Services (CIPS) to identify opportunities for collaboration between CAs and Indigenous communities in Ontario. Current areas of focus for these partnerships is identifying flood mapping opportunities as well as watershed management goals and opportunities in the face of climate change. Additionally, Conservation Ontario, LTVCA and CIPS are collaborating with the Chippewas of the Thames First

Nation community to develop flood mapping and build capacity with the community along the Thames River. These collaboration opportunities are currently being supported with funding from Crown Indigenous Relations and Northern Affairs Canada (CIRNAC).

- The Georgina Island Subwatershed Plan: The Province of Ontario funded the Chippewas of Georgina Island and Lake Simcoe Region Conservation Authority to jointly develop a subwatershed plan for the First Nation's reserve lands. This plan integrated both western science and traditional knowledge to describe the current state of the reserve, identify its vulnerability to climate change, invasive species, and land use change, and develop recommendations to build upon both western science traditions and Chippewas cultural traditions to improve watershed health.

The examples provided here outline positive participation, collaboration and partnerships between various levels of government, agencies, and community groups with Indigenous Peoples in Ontario. Effective freshwater management in Canada will require active participation, collaboration and knowledge-sharing between all levels of government, applicable agencies, and Indigenous Peoples to ensure that the perspectives and needs of all freshwater users, managers and protectors are considered. To support the involvement of First Nations, Métis and Inuit Peoples, the federal government will need to consider opportunities to provide funding and/or resources to these communities in order to build capacity for engagement and knowledge-transfer.

Section 3.5 Agriculture and Freshwater

A: How should Canada support the agriculture sector to sustainably manage freshwater resources needed for production and to enhance resilience?

Generally, the list of possible opportunities in the discussion paper will all contribute to improving support for the agricultural sector in Canada. There are opportunities for multiple benefits to society and the environment when the agricultural sector places a strong importance on sustainable management of freshwater resources. Agricultural lands provide important ecosystem services, including supporting functions (e.g. soil formation, nutrient cycling, primary production), provisioning (e.g., food and fiber), regulating (e.g., climate regulation, water regulation and purification), as well as cultural functions (e.g., spiritual and religious, recreational, aesthetic, educational and cultural heritage). To support this sector, the federal government should be providing information, tools and resources to foster positive decision-making regarding freshwater resources, for example, continuing to support incentive programs which help to increase adoption and reduce the risks to farmers associated with implementation of best management practices that support freshwater management and protection.

Agricultural land use and land management may have real implications for downstream water resources/features/systems and users. As such, it should be recognized that there are many stakeholders for agricultural water issues who should be involved in supporting this sector. Through the CWA, the federal government should encourage collaboration on a watershed basis to ensure that all relevant and affected stakeholders are involved in discussions and decision-making for freshwater management and resiliency for the agricultural sector. The federal government is encouraged **to continue to support and strengthen** its investments in watershed-based collaboration, research, science and technology

Through collaborative programs and partnerships, CAs manage freshwater resources on a watershed basis with a range of agricultural stakeholders, including communities, agricultural organizations, and local producers (e.g., Healthy Lake Huron, Thames River Shared Waters Collaborative, Drinking Water Source Protection, delivery of municipal rural water quality programs, projects to decrease phosphorus loading in the Great Lakes, etc.). Many of these collaborative programs and partnerships are funded by local, provincial and federal governments, and are designed to equally benefit the agricultural sector and the management and protection of freshwater resources (e.g., testing and evaluation of new innovations and technologies, evaluation of natural assets and green infrastructure, and programs to limit impacts of flooding and drought).

Ultimately, any proposed management actions or strategies from the federal government should aim to reduce or mitigate the impacts of agricultural land use on freshwater resources, as well as enhance agricultural resources for future generations. To support these actions, the federal government should consider:

- Helping to clearly defining the role of agriculture in freshwater management including how water use needs differ in this sector (e.g., water needs of greenhouse operations vs livestock) and other sectors – e.g., Municipal, manufacturing, etc.
- Providing communication/promotion and support to highlight the role of the agricultural sector in the protection of freshwater resources
- Providing clear direction and communication on the economic value of natural assets and ecosystem services of naturalized spaces for freshwater in agricultural systems to better support the business case for protection and management of these assets.

B: What new or improved tools or science-related information would help the agriculture sector to enhance water management?

To support enhanced freshwater management within the agricultural sector, the federal government, through the CWA should consider establishing standardized procedures and protocols for data collection, data processing, as well as best management practices for operations. The CWA should further consider taking on a role of coordinating and disseminating best management practices across the country to improve knowledge transfer within the industry, particularly with regard to understanding linkages between agricultural land management, other land uses and freshwater management. Specific tools, resources, information or support needed may include:

- Undertake improvements to federal climate data websites which are accessed by a broad range of users, including the agricultural industry. Often climate data is geared towards urban centres, however expansion of this data would be useful in rural areas (e.g., climate data can help to determine agricultural water use for precision agriculture in rural areas).
- Accessible and regularly updated Drought Vulnerability Mapping which can be accessed by agricultural producers to be proactive with planting practices. In doing so, solutions or best management practices should be developed in collaboration with multiple levels of government and agencies regarding agricultural water use in drought vulnerable areas.
- Regular funding support for organizations such as CAs to prepare up-to-date flood mapping and undertake activities to support low-water response.

Section 3.6 Economic Sectors and Freshwater

A: What sectors do you believe will face the greatest freshwater challenges nationally, and in your region in the next 5, 10, and 20 years? What support is needed to assist sectors in addressing these challenges in terms of technology, information, and other approaches for sustainable freshwater management?

As a general comment, Conservation Ontario notes that this section suggests that freshwater is valued in terms of federal GDP solely on the basis of how it is used by established economic sectors. This reinforces how freshwater in Canada does not currently carry an economic value on its own. The economic value of this natural asset should be reflected in federal accounting as its own line item, not simply valued as an economic driver in standard sectors that are currently included in GDP calculations. There is general lack of recognition that access to clean and safe freshwater is paramount to human survival and ecological well-being, and as such, holds an inherent economic value.

The following is provided as a summary of sectors which are currently facing, and may continue to face the greatest freshwater challenges across Canada and the support they require to face those challenges:

- **Agricultural Sector:** This sector will require support from all levels of government to understand the dual roles it will play, both as a manager and protector of freshwater resources, as well as a consumer of these resources. Additional support will be needed as the agricultural sector continues to evolve, particularly due to the loss of productive agricultural land to urban development. This has resulted in greater conversion of natural areas into agricultural lands, as well as the push of agriculture into less fertile areas which require more inputs to generate cost-effective yields. Investments in agri-environmental and risk management programs which encourage the adoption of freshwater management practices that support the environment and agribusiness are also required.
- **Tourism and Recreation:** Support will be required to manage and mitigate issues which negatively impact recreational use of freshwater resources, particularly within the Great Lakes (e.g., algal blooms, water quality and quantity (lake levels)).
- **Public Health and Safety:** Support for determining climate change impacts on drinking water sources (Ground and surface water). Support will also be required to build resiliency in both the ground and surface water sources to mitigate any quality or quantity concerns. Additionally, there should be continued focus on the impact of Harmful algal blooms (HABS) on human health related to drinking water resources. The Ontario Minister of the Environment, Conservation and Parks' Report on Drinking Water (2020) provided a record of 91 reported HABS in Ontario. This number is projected to grow with climate change impacts
- **Building and Development:** Support will be required for local and regional levels of government regarding implementation of best practices and new technologies/approaches for stormwater, waste water, and drinking water management. Communication/promotion of awareness for legacy and new residential development near Great Lakes Shorelines (e.g., better understand of the dynamic nature of the Great Lakes with regard to water levels and coastal processes in particular and the potential impacts to development (such as wave uprush, shoreline flooding and erosion, etc.).
- **Insurance:** Support will be required to assist this sector as a result of payments for damages resulting from extreme weather events, flooding and erosion, particularly shoreline erosion in the Great Lakes-St. Lawrence River basins.

B: What are some positive examples of freshwater challenges addressed in sector-specific strategies and what can we learn from them?

Conservation Ontario offers the following positive examples of freshwater challenges addressed in sector-specific strategies which may be considered by the federal government as they establish the CWA:

1. **Building and Development:** The Sustainable Technologies Evaluation Program (STEP): The STEP offers an impressive model for a data sharing, information and guidance hub on green infrastructure evaluation and implementation. The program includes design guidance, case studies, performance data and other resources. More details on STEP are provided in response to question 3.10 (c).
2. **Multi-Sector:** Conservation Authority Integrated Watershed Management (IWM) Approach: The IWM approach used by Ontario's conservation authorities engages multiple-sectors including primarily municipal and private sectors across geo-political boundaries on a number of initiatives related to conserving and protecting freshwater.
3. **Multi-Sector:** The provincial Drinking Water Source Protection (DWSP) program, was established under the Clean Water Act, 2006, as a response to Ontario's Walkerton Tragedy in 2000. The program offers a positive example of a collaborative, multi-stakeholder, locally-driven approach to protecting municipal drinking water sources. The DWSP program brings together a wide-range of stakeholders, including conservation authorities/Source Protection Authorities, various levels of government (Provincial & Municipal), First Nations, and representatives from other sectors (agricultural, economic, etc.) to develop and implement watershed-based source protection plans which identify policies to protect existing and future sources of municipal drinking water.
Implementation of the program builds upon a regional repository of source water protection scientific research (data, mapping, etc.), and policy (assessment reports, source protection plans, etc.), which is aggregated at the provincial level, and supported by provincial funding. Given the collaborative, multi-stakeholder approach used, the DWSP program is continuously evolving with the emergence of new science and increased understanding of impacts on the landscape, such as increasing land use and freshwater needs due to population growth.
4. **Agricultural Sector:** Through various federal-provincial agricultural policy initiatives over recent years, this sector has undertaken many activities to address freshwater challenges, including watershed based Best Management Practices Evaluation, the Great Lakes Agriculture Sustainability Initiative, and ONFARM.

Section 3.7 Freshwater Science

A: What are the priority knowledge and research gaps to be filled to achieve effective freshwater management over the next 10 years?

As a general comment, Conservation Ontario notes that across various levels of government, agency and industry in Canada, there is a disconnect between those agencies and individuals who generate new ideas and knowledge regarding freshwater management, and those individuals or agencies who will implement freshwater management actions. Too frequently scientific advances do not get implemented at local and regional management levels, as local/regional managers do not have the capacity or resources to integrate changing scientific knowledge into implementation actions. This is particularly felt within the CA level in Ontario (local/regional practitioners), as a lack of sustainable funding can result in slower evolution or advancement in water science, particularly within authorities with strained capacity.

In the following, Conservation Ontario offers an overview of some of the priority knowledge and research gaps to be filled to achieve effective freshwater management over the next ten years:

- Improved understanding of freshwater quality and quantity at the local/regional scale (watershed, subwatershed, catchment basin, river basin). Watershed characterization similar to what was done in the Source Water Protection (SWP) program in Ontario is a good start, which can assist with establishing the carrying capacity in terms of consumptive use and transport of freshwater outside the watershed.
- Enhanced understanding of impacts on freshwater resources due to climate change at the regional/local scale (watershed / subwatershed) is recommended.
- Inclusion of groundwater quality knowledge in public discourse and decision-making.
- Improved freshwater data accessibility, management and access. The federal government should work with all levels of government, as well as freshwater management agencies to federate data such that all available sources can be searched in a single “hub”. Where available and feasible, data sets should be coordinated to better understand cumulative impacts collected at monitoring sites (flow, water chemistry, groundwater, biological information).
- Improved mapping resources (floodplain, baseline mapping for water resource systems). There currently is significant variability across Canada in the approaches used for different mapping, and a unified approach is needed to account for climate change impacts/effects.
- Improved understanding on existing and emerging contaminants in groundwater and surface water systems (e.g. pharmaceuticals, phosphorus, road salt) with consideration to a multi-stressor approach.

B: How well is freshwater science coordinated today? If further coordination is needed, how might that be accomplished?

Currently in Canada, freshwater science is fragmented and largely uncoordinated. A significant amount of freshwater data is not publicly available, and freshwater management roles across all levels of government are not clearly defined, which can lead to duplication of effort among all levels of government and other freshwater management agencies such as CAs. As proposed in the discussion paper, there is a need to create an agency which champions freshwater management across Canada. The opportunities listed in the discussion paper offer a positive approach to better coordinating freshwater science through the CWA, including working with provinces, territories and others to develop a national freshwater science agenda and improve science integration and communication across governments, academia, and other agencies. To support this approach, the federal government is encouraged to have the CWA represented within each Province or major watershed area in Canada in order to better coordinate freshwater management and protection strategies among all scales (local/community, regional/watershed, and federal) in each management area.

In addition to the data, a significant amount of freshwater science is not publicly available either. The peer-reviewed literature is a very important mechanism for scientists to disseminate their findings, engage in scientific dialogue with their peers, and rapidly build knowledge. Much peer-reviewed literature is only available via subscription to academic journals however, and the cost of subscription can be a barrier for local agencies. To remove this barrier, the Federal government could consider creating an open access journal focused on water management (as one of its portfolio of “Canadian

Journal of ...”) or provide funding to the researchers its supports to ensure that all research is published in an open access format.

Section 3.8 Freshwater Data

A: What are your experiences with freshwater data? What worked well and what areas have the most room for improvement? Are there good models to learn from?

Currently, freshwater data is often difficult to find and access, and available federally collected data is often too coarse for use at the local watershed level. Funding and human resources available for programs at the provincial level in Ontario have decreased in recent years to the point where smaller, local watershed management agencies like CAs and grassroots initiatives based on Citizen Science are relied upon to fill data and information gaps. A lack of available funding to support these initiatives has resulted in a decentralization of sources of freshwater data and a resulting divergence with respect to data collection methodologies, data storage and maintenance standards, naming conventions as well as metadata standards. As such, datasets from different sources are more difficult to integrate for a broader regional analysis when needed. Scalable resources and guidance are needed to bring freshwater data standards into better alignment.

For example, groundwater data is collected in Ontario primarily for provincial regulatory activities and through the course of municipal development approvals. The resultant data is often left inaccessible to other levels of government and freshwater management agencies, as it either remains with the collecting entity or is published in PDF documents that are not readily accessible and useable. Inaccessible data has an impact on evidence-based decision-making, and as such, should be made openly available in a consistent, machine-readable, useable format.

Conservation authorities have made advancements in recent years by collaborating with each other and with like-minded organizations to leverage investment and make monitoring and other water-related datasets more readily discoverable and accessible. CAs have undertaken this work through the use of a common metadata application and through utilizing broadly accepted data exchange standards like the Open Geospatial Consortium (OGC) WaterML (utilized by Kisters North America in the WISKi (Water Information Systems by Kisters) data model).

Other examples of successful partnerships that could serve as a model for the CWA to learn from include:

- The Oak Ridges Moraine Groundwater Program (ORMGP) – a partnership between municipal government, the Geological Survey of Canada, the Ontario Geological Survey and conservation authority geoscientists that supported the creation of a regional database of borehole information that was collected, standardized and made available through a data hub accessible to partners and the public.
- Datastream (The Gordon Foundation) – an application with a comprehensive model for providing open data that integrates data sources from different organizations (citizen science, NGOs, municipal, etc).
- The Provincial Water Quality Monitoring Network and Provincial Groundwater Monitoring Network – a partnership between the Province of Ontario, who provides laboratory services and Ontario conservation authorities who provide field support and gather the samples.

B: What advances in data analytics present opportunities for freshwater management and decision-making? What can the Government of Canada do to capitalize on these opportunities?

Long reports are often not consumable by local water managers and the public. The federal government is encouraged to leverage recent advancements in “smart” technology, including real time data and Artificial Intelligence (AI)-powered analytics, which have presented new possibilities for freshwater data management and decision-making.

Smart devices and sensors have made it possible for water managers and decision-makers to be alerted in real time when measured parameters reach certain thresholds. This has decreased the time from data measurement to decision, allowing freshwater managers to react more quickly to changing environmental conditions such as flooding events. Real time monitoring equipment has become more readily available and affordable in recent years.

Many CAs leverage partnerships and collaborate on data collection and storage protocols through initiatives like the Ontario Conservation Authority’s WISKi Data Hub – a network of CAs that strategically and collaboratively invest in the Water Information Systems by Kisters for local, regional application. By utilizing the same platform and data model, neighboring CAs can share data seamlessly and rely on each other’s expertise to help support and troubleshoot the system. The same technology leverages a web operability solution called KiWIS that web-enables the database for public visualization through partner websites in near real time.

By leveraging these existing partnerships and established standards, the Government of Canada can remove many of the barriers to freshwater data integration at a national scale and ensure the public has access to the information in a way that’s meaningful and easy to understand and digest.

A successful partnership for CAs has been one with Environment and Climate Change Canada (Water Survey Canada) and the Ontario Ministry of Natural Resources and Forestry – a cost-share agreement that provides funds for the purchase and installation of monitoring sites along Federal waterways. CAs undertake the monitoring and provide data back to all partners. These types of partnerships benefit from solid agreements at the outset that define the ownership of intellectual property (IP) and structure the rights and responsibilities governing the release of open data to the public. A lack of such agreements can be a barrier to the eventual release of the information as open data.

Finally, the Drinking Water Source Protection Program in Ontario was successful in producing a set of collaboratively developed data formats and standards that allowed data collectors (municipalities and their consultants as well as CAs) to manage and share data amongst each other and the Province of Ontario relatively seamlessly. This initiative was a costly and lengthy one due to the standards being developed by the data recipient (the Province) with input from the data collectors. Although successful from a data interoperability standpoint, use of the data is still somewhat restricted because of the complex nature of the agreements struck between the parties. If open sharing of the data was a principle agreed upon at the outset of the program, this problem could have been avoided.

C: What are examples of where compatibility and interoperability of data across orders of government and with non-government organizations has been achieved? What can we learn from these examples?

Examples are provided in response to the other questions in Section 3.8.

Section 3.9 Transboundary Freshwater Management

A: Canada has many positive examples of transboundary freshwater management. What can we learn from these experiences and build on moving forward?

The Discussion Paper outlines some of the many positive examples of transboundary freshwater management in Canada, including the Great Lakes Water Quality Agreement and the Boundary Waters Treaty, which resulted in the establishment of the International Joint Commission. One such positive example which the federal government can learn from and build upon moving forward was the result of recommendations from Special Advisory Doug McNeil's report on the 2019 flood events in Ontario. During the spring of 2019, heavy rains paired with melting snow and a sudden temperature increase led to devastating flooding across many areas throughout northern and southern Ontario. In response to these flood events, the provincial government appointed Special Advisor Doug McNeil to review the province's current flood management framework and provide recommendations to the government on opportunities to improve the existing framework. During the initial period of extreme water levels and flooding in Ontario, misinformation circulated amongst concerned citizens, resulting in the emergence of some misguided public campaigns. As part of the Special Advisor's review, the IJC was requested to provide more information to the public about their flood operations, and in doing so, consult with interested stakeholder groups and individuals (see *An Independent Review of the 2019 Flood Events in Ontario* by the Provincial Flood Advisor, recommendations 55, 56, 57). The IJC response was excellent with a greatly improved website and information source regarding current and forecasted conditions and causes of extreme levels, extensive response to Frequently Asked Questions that dispelled a great deal of misinformation, and an expedited consultation program by the Great Lakes Adaptive Management Committee that included meaningful consultation with residents, municipalities and agencies.

The lesson to learn from this success story is that promoting and ensuring availability of accessible freshwater management information is powerful in shaping public support and discourse. A lack of clear and readily available information can lead to the creation and spread of misinformation about current policies and operations within communities. It is important that freshwater management information be available and promoted to ensure that the general public and interested groups are aware that water programs are being appropriately and proactively managed.

In addition to ensuring that information is readily available, it is equally important to communicate/share available information between all levels of government and agencies. Information needs to be shared down from agencies like the IJC to local-level agencies such as municipalities and CAs, and on-the-ground information related to freshwater resources needs to be shared upwards to help inform decision-making bodies of local conditions and needs.

In addition, the Groundwater Information Network (GIN) is a positive example of a transboundary initiative where a uniform format of information is shared throughout neighbouring jurisdictions.

Finally, the Great Lakes Water Quality Agreement is a positive example which recognizes the basin/watershed as the ecosystem boundary for analysis and planning. It engages watershed management agencies, indigenous representatives, all levels of government and the private sector at the Great Lakes Executive Committee table and Annex Committees addressing priority issues of the

Agreement. As Committee discussions are now occurring via videoconferencing, the Committee is encouraged to open these discussions to all observers in order to keep the Great Lakes community informed. It is noted that the current approach of sharing meeting notes on a bi-annual basis with a six-month time lag does not allow for Committee members to adequately engage with their communities.

B: What is needed to ensure that water boards have the science and data they need to manage and protect transboundary waters, including in the context of climate change adaptation?

To ensure that water boards have the science and data they need to effectively management and protect transboundary waters, robust information collection, data management, and reporting programs must be in place at all times to ensure decision making is fueled by scientific information rather than opinion or political influence. Adequate long term reliable funding is further necessary to ensure information programs run uninterrupted.

Climate change adaptation requires that we not only consider long term averages and extremes in freshwater systems, but also consider more recent trends and predicted swings to more extreme weather. Additional research, collaboration, and discussion amongst the scientific community will assist with adaptation efforts. As an example, recent research on the loss of ice cover for Lake Ontario (due to climate change) by Environment Canada has informed CA Shoreline Hazard Management Plans, and provided awareness that greater wave energy and shoreline erosion rates should be anticipated. These considerations will guide local policies and regulation of shoreline development in Ontario.

Lastly, all jurisdictions (government, agencies, industry, etc.) should be encouraged to utilize a single comprehensive and encompassing climate change model. Consistency in modelling approaches is particularly important, as there is often inconsistencies in the modelling used across multiple levels of government and agencies, which may lead to duplication of effort.

C: How should the Government of Canada support Indigenous peoples in transboundary water management?

No response provided.

Section 3.10 Freshwater Technology, Innovation and Infrastructure

A: What are your thoughts on the technology and infrastructure priority areas identified above? Should others be considered?

Conservation Ontario commends the federal government on the listed priority areas, as they are all important, with many of these priority areas representing strong linkages with priorities for CAs. As we have stated in earlier comments, there is a need to proactively implement advancements in freshwater technology, innovation and infrastructure to address localized issues across Canada, particularly as we prepare for greater impacts resulting from climate change.

Upon review of the priorities, we note that number five “*Better inform federal government infrastructure investments and climate change adaptation by adopting baseline criteria to designate flood hazard areas*” may require additional refinement / clarification with regard to “adopting baseline criteria to designate flood hazard areas”. Effectively achieving this priority will require engineering input and consideration of local conditions to inform the development of necessary floodplain mapping.

Lastly, with respect to priority number three *“Provide targeted support for scaling and commercializing freshwater technology by improving data access critical to innovation; identifying funding opportunities; and making connections between technology developers, academia, federal scientists, and end users”*, the federal government is encouraged to improve access to data by exploring improvements to on-line tools which facilitate open data sharing and federation of available datasets. As these tools are developed, the government will need to consider the evolving data needs for levels of government and agencies to undertake freshwater management activities in their jurisdictions (e.g. improved hydrometric monitoring data).

B: What are the most important freshwater infrastructure priorities for your community, including those needed to adapt to a changing climate?

Conservation Ontario offers the following summary of the most important freshwater infrastructure priorities within CA watershed jurisdictions in Ontario:

1. Greater investments in and research on the economic value of natural assets and green infrastructure.
2. Greater investments and innovation for storm water infrastructure, as current infrastructure is inadequate and outdated with increasing maintenance costs and shorter life span projected as a result of climate change. Additionally, priority should be placed on retrofitting older development and municipal infrastructure where storm water controls are not at present day standards.
3. Additional funding to implement completed watershed plans and hazard mapping projects. Other examples where implementation funding is a priority include where Great Lakes coastal damage centres have been studied and plans have been established to reduce natural hazard risk through avoid, accommodate, protect and retreat approaches.
4. Additional support for flood forecasting activities, including more real-time monitoring infrastructure.
5. Information and funding support for flood risk assessments of the built environment, particularly with increasing impacts due to climate change.

C: What models should the Government of Canada consider to enhance coordination and collaboration on freshwater technology, innovation and infrastructure?

The federal government is encouraged to build upon the many existing positive models of coordination and collaboration within Canada. For example, many CAs have had the opportunity to collaborate with their municipal partners to secure National Disaster Mitigation Program (NDMP) funding which has allowed CAs to conduct flood risk assessments, update watershed floodplain mapping, complete Shoreline Hazard Management Plans, improve flood forecasting equipment, and complete mitigation assessments for flood damage centres. The program has been running for a number of years (since 2015), and allows CAs to plan ahead for future projects, and to arrange for matching funding. This coordination of resources between various agencies and levels of government has yielded great successes throughout Ontario. However, in order for these collaborative partnerships to continue, secure, regular funding must be achievable. For instance, programs such as the Flood Damage Reduction Program in the 1980’s promoted three levels of government involvement, with funding allocation split amongst the various levels. Consistent, multi-year programs supports by funding and participation from all levels of government will yield the greatest results.

An additional model of positive coordination and collaboration on freshwater technology, innovation and infrastructure needs is the Sustainable Technologies Evaluation Program (STEP). STEP is a multi-agency initiative developed to support broader implementation of sustainable technologies and practices within a Canadian context. The “Water” component of STEP focusses on areas such as: urban runoff and low impact development, erosion and sediment control, healthy soils, salt management and protection of natural features and systems. STEP acts as a hub for data and information sharing, as well as an overall guidance hub on green infrastructure implementation. Through this work, STEP brings together CAs, municipalities, private contractors and professionals, provincial ministries and federal departments to provide design guidance, case studies, performance data and many other resources.

Section 3.11 Engaging Canadians in Managing and Protecting Freshwater

A: What specific tools and approaches will be most effective in advancing high-quality citizen and community science and data for freshwater decision-making, and in enabling involvement by all groups?

As a federal agency, the CWA would be well-suited to lead the development of freshwater related citizen science programs that could be supported and promoted by local watershed management agencies, including CAs. As community-based watershed management agencies, CAs are well situated to assist with implementation of citizen science initiatives across Ontario.

In order to facilitate and advance high-quality citizen and community science and data for freshwater decision-making, any study design must be easily implementable and consistently applied to allow for broad participation at the community level. In doing so, the federal government will need to ensure that studies/programs are supported by comprehensive training, and good QA/QC procedures to ensure data is of a high-quality so that it can be used effectively in decision-making. Further, it is recommended that any citizen / community science programs be implemented and coordinated over broad geographic areas in order to improve the value of aggregated data. Providing coordination for these programs will improve the resulting data collected, as compared to only providing communication materials to guide citizens in their work. In developing such programs, the federal government is encouraged to look into frameworks for existing programs, such as CoCoRaHS (Community, Collaborative Rain, Hail and Snow Network), as well as CitSci (as a model for a centralized repository). For citizen science to be effectively implemented and leveraged for decision-making, the organizing body needs to ensure participating members are adequately trained and supported, communication with participants is regular (including communication of results), and participants are informed of long term goals in order to maintain long-term participation and a connection to the stewardship actions. In creating effective communication to support these programs, the federal government is encouraged to consider Ontario’s CA Watershed Report Cards as an example of a tool for communicating aggregated monitoring outcomes. Watershed Report Cards incorporate monitoring information in communication and education materials to improve public understanding of surface and ground water quantity issues and the value of monitoring programs across Ontario.

Section 3.12 Overarching Discussion Questions

A: What are your views on the possible opportunities to enhance freshwater management identified in sections 3.2 to 3.11? Which should be the highest priority? What is missing?

The following are excerpts from sections 3.2 to 3.11 (in no particular order other than 1 to 5 being the more generally described opportunities) that capture the best opportunities include:

1. Support engagement on freshwater issues among all orders of government and by convening experts, facilitating information sharing, and supporting collaborative initiatives.
2. Build federal capacity to research and experiment with innovative policy solutions to address freshwater challenges and support climate change adaptation.
3. In collaboration with other governments and partners, respond to unique regional water management challenges by supporting regional centres of expertise that bring expertise together to focus on issue-specific freshwater science.
4. Together with other governments and partners develop and implement tools to improve science and data sharing and knowledge mobilization.
5. Promote technology development in relation to identified priorities, including but not limited to: climate change adaptation, climate friendly freshwater technologies, and climate resilient infrastructure; groundwater and surface water monitoring and prediction; rural and remote community water security, including drinking water quality for small systems; wastewater treatment; efficient freshwater use in oil, gas and mining sectors; efficient irrigation solutions for agriculture; and tools to protect biodiversity, wetland health and natural ecosystem functions.
6. Improve water prediction at regional and local levels to better support decision making by pursuing innovations in atmospheric, ocean, ice, and water prediction using new observation technologies, earth observation data, and models that can better characterize terrestrial snow, surface, and groundwater, and the integration of climate change scenarios.
7. Improve coordination of science-related information and activities to bridge knowledge gaps across jurisdictions and within the agricultural sector to ensure that farmers have access to the data and knowledge needed to make effective freshwater management decisions.
8. Undertake targeted studies to anticipate, mitigate, and resolve emerging domestic and Canada-U.S. transboundary freshwater issues and other freshwater issues of national significance, such as the impacts of climate change.
9. Together with provinces, territories, and others, agree on a National Data Management Strategy, including principles and common standards to ensure that freshwater data is collected and managed in a consistent manner, leading to effective and efficient data integration that provides more comprehensive insights.
10. Engage the U.S., provinces and territories, Indigenous peoples, and others in climate impact assessments for transboundary waters so that decision-makers have the information they need to make adaptive management decisions coordinated across jurisdictions.
11. Better inform federal government infrastructure investments and climate change adaptation by adopting baseline criteria to designate flood hazard areas.
12. Advance the development, testing and implementation of natural infrastructure solutions to climate change impacts, including wetland protection and restoration. Natural infrastructure can increase resilience to floods and drought; improve water quality; and provide a cost effective alternative to replacing aging infrastructure.
13. Engage Canadians directly in learning about and protecting freshwater resources, species and ecosystems by developing and implementing a comprehensive strategy linked to the needs of decision-makers in order to increase the conduct, value, sharing, and use of community-based freshwater monitoring, including participation by Indigenous peoples.

Conservation Ontario respectfully suggests that the following opportunities are missing from those described in the discussion paper, and should be considered:

- Advance watershed (and Great Lakes coastal) science to ensure environmental sustainability and effective management of the freshwater resource system
- Advance the ecosystem service value of freshwater and recognition of the financial valuation of this natural asset in federal government accounting and reporting. Providing clear direction and communication on the economic value of this natural asset will help to build the business case for increased freshwater management and protection in Canada.
- Enhance coordination amongst Federal agencies, provincial and municipal governments, and US government agencies to more effectively restrict the spread of aquatic invasive species into Canada, and across basins in Canada. This could include the development of watch lists of priority species, areas of high potential for entry, citizen science programs for early detection, and response plans to deal with those which do expand into (or cross basins within) Canada

B: Which of these possible opportunities should be priority roles for a CWA?

Some of the opportunities can best be undertaken at a local or regional scale to meet community needs and sustain local freshwater ecosystems through local action. The role of the CWA would be to support these at the federal level through policies, standards, incentive/partnership programs that advance collaboration, science, data sharing and knowledge mobilization. Additional opportunities that should be undertaken specifically by the CWA include:

- Climate Change (Section 3.3) given the scale of climate change processes and including coastal resilience of the Great Lakes
- Indigenous Peoples (Section 3.4) given the Nation to Nation, Reconciliation, Duty to Consult and Treaty obligations with the Federal Government
- International Transboundary Freshwater Management (Section 3.9)

Section 4.0 Governance Considerations for a Canada Water Agency

A: What are examples or best practices from other jurisdictions or other governance models the Government of Canada should consider in creating a CWA?

The Canada Water Agency should exist under Environment Climate Change Canada (ECCC) to easily connect with other environmental agencies. The CWA should also have a certain degree of autonomy to coordinate all freshwater-related programs and projects at all levels of government and other stakeholders outside of ECCC. As recognized around the world, the best practice is to ensure that water resources are governed on a watershed basis as the ecosystem boundary.

The Canada Water Agency and sub-agencies should coordinate between the various watershed scales and convene Committees/tables with representatives from each (e.g. Great Lakes Water Quality Agreement Executive Committee includes Indigenous Peoples, Federal, Provincial, Watershed and Municipal agencies - binationally).

The CWA should champion and promote an integrated watershed management approach (recognizing both water quantity and water quality, surface/groundwater resources and interactions, Great Lakes/Coastal water levels, etc.) through adaptive co-management implementation at the local level

(e.g. POLIS Project on Ecological Governance; various examples). To achieve this goal, funding incentives/opportunities for watershed-based actions, based in best-available science that engages watershed communities for protection and improvement of freshwater resources will be required (e.g. Watershed-based phosphorus reduction programs for Lake Erie; Ontario's Source Water Protection Plans and implementation of Watershed/subwatershed plans in Ontario). As well, the CWA should enable capacity-building to make data accessible and shared. For example, CO obtained funding from Great Lakes Observing System (GLOS) to establish metadata standards for priority freshwater datasets housed at Ontario's conservation authorities and an open data platform. It is noted that GLOS obtained funding to support this initiative through the Great Lakes Region of the National Oceanic Atmospheric Administration which recognizes watershed boundaries. Collaborative development of a broader research/science agenda to support freshwater protection and decision-making will need to be facilitated with particular leadership around tools for climate change adaptation and resilience. There is a global Coastal Resilience public – private partnership model that appears to be successfully applied in the United States with NOAA and the USGS being key partners in the Great Lakes. As well, the NOAA Digital Coast partnership is another example of collaborative management

In general, the CWA is encouraged to build on existing, successful practices and frameworks, such as the integrated watershed management framework used by Ontario's CAs, and to leverage the collective knowledge and innovation potential of the private and academic sectors.

B: What are your views on the considerations presented? What should be the highest priority? What is missing?

Conservation Ontario is in general agreement with considering the US model of one agency for protection and the other for information / data. The US has positive examples of nationally coordinated data, as well as online tools for flood forecasting, coastal resilience, and water quality reporting. In particular, the USGS organization structure and the way information is disseminated, e.g. properly designed website. The National Oceanic Atmospheric Administration's leadership to build capacity on water information has directly supported CAs through GLOS funding. Missing is reference to the NOAA partnership initiatives around Coastal Resilience and Digital Coasts – a priority for Great Lakes Shorelines.

Further, we agree with the approaches used by national water agencies that organize their work around watersheds, such as France and Japan. Particularly, the approach used in France where six basin-level agencies each have a committee made up of local authorities, manufacturers, farmers, consumers, government officials, and non-government organizations which are responsible for the Water Development and Management Master Plans should be explored by the federal government.

Notably absent as an example is the integrated watershed approach used by conservation authorities in Ontario. Overall, the Conservation Authority model is based on the watershed as the ecosystem boundary (rather than political boundaries) and it is an excellent way to address the freshwater management and protection issues that the Canada Water Agency will be dealing with. It is highly recommended that this model be supported throughout the rest of the country – with appropriate funding.