



The Honourable Kirsty Duncan, P.C., Minister of Science
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Minister Duncan,

On behalf of the Royal Society of Canada (RSC), we thank you for seeking our advice regarding the remit of the Chief Science Officer. In 2015, the RSC published a Position Paper¹ arguing that expert, independent, and objective scientific advice was fundamental to policy development and decision-making. We commend the government for appointing a Chief Science Officer, which we view as an important step in the right direction.

Modeled on the Royal Society of London, the RSC has embraced exceptional Canadian scholars since it was established by an Act of Parliament in 1883. The RSC consists of three bilingual Academies: the Academy of the Arts and Humanities, the Academy of Social Sciences, and the Academy of Science. We are limited to 80 new fellows per year, and each of those fellows is rigorously chosen for their exceptional contributions to the fabric of Canada. The process for selection is similar to the one used for the Order of Canada and depends on nominations, and detailed letters from around the world attesting to the individuals' impact. At the present time, there are about 2100 fellows.

In 2014, the RSC also founded a College of New Scholars, Artists and Scientists. With up to 100 new members each year, each elected for a 7-year term, the college recognizes exceptional potential in the emerging generation of Canadian intellectual leadership. Our mission is “to serve Canada and Canadians by recognizing Canada’s leading intellectuals, scholars, researchers and artists and by mobilizing them in open discussion and debate, to advance knowledge, encourage integrated interdisciplinary understandings and address issues that are critical to Canada and Canadians.” This mission aligns us with the government of Canada and makes us an exceptional reservoir of expertise and collegial integration of diverse scholarly and creative perspectives.

In particular, the RSC has an established track record of producing Expert Panel reports that are explicitly at arms length from the stakeholders to address challenging topics that are important to Canada and Canadians. Within the past two years our three Expert Panel reports have been: *A Review of Safety Code 6 (2013): Health Canada’s Safety Limits for Exposure to Radiofrequency Fields*; *The Behaviour and Environmental Impacts of Crude Oil Released into Aqueous Environments*, and *The Future Now: Canada’s Libraries, Archives, and Public Memory*.

Thus, the RSC already occupies an important role as science advisors within Canada and has a strong interest in the successful implementation of the office of Science Advisor. Given this background, we offer the following responses to the questions that you posed to us.

1. What role do you see the Chief Science Officer (CSO) fulfilling within government?

A Chief Science Officer is a key element of science advice in many countries.² We concur with the mandate for the CSO as described in your letter: “to ensure that government science is fully available to the public, that scientists are able to speak freely about their work, and that scientific analyses are considered when the government makes decisions.”

The last mandate, in particular, is one where the RSC and the CSO could profitably work together.

1. Royal Society of Canada. 2015. Strengthening Government by Strengthening Science Advice: Fully realizing the value of science to Canadian Society. (<http://www.rsc.ca/en/friends-partners/newsroom/press-releases/royal-society-canada-issues-position-paper-strengthening>)

2. Hutchings, JA & NC Stenseth. “Communication of Science Advice to Government.” *Trends in Ecology & Evolution* 31.1 (2016): 7-11.

By tapping into the RSC's network of Fellows, new scholars, artists and scientists as well as the broader worldwide academic community, we offer our services to the Government of Canada to provide advice on scientific issues and to make connections with relevant experts. Given our broad memberships, we are uniquely placed to gather consensus opinion on issues of policy importance and also to assess and advise on key areas of uncertainty.

We stress that the success of a Chief Science Officer must also depend on the council that he/she is able to receive on a regular basis. The CSO can count on our input, and we hope to establish formal and informal links with the CSO.

In addition, we recommend that his/her science capacity is augmented through the formation of a *Science and Technology Advisory Committee (STAC)*, comprised of established scientists and research leaders from a diversity of disciplines and charged with providing science-policy advice.³ Again the RSC would be delighted to have seats at this table and can also provide assistance in identifying appropriate candidates that represent the breadth and depth of Canada's scientific research capacity.

2. How would you like to see the CSO engage with the research community and the broader public?

*"The legitimacy of scientific evidence depends critically on communication and transparency...If scientific advice is to be useful to decision-makers, it must be expert-driven, independent, and objective."*⁴

The engagement of the Chief Science Officer with scientists and the broader public is critical for efficient knowledge transfer and for generating an open governance environment in which the nature of evidence under consideration is knowable.

Again, this is an area where the RSC could be of assistance. The RSC can facilitate communication between the CSO and our network of scientists throughout Canada and around the world. For example, we could issue calls to our members for information (e.g., briefs on novel scientific issues and opportunities) or bring together groups of experts to discuss particular topics and prepare reports and recommendations on topics of importance to Canada and Canadians.

The Royal Society of Canada would also like to be a conduit to our community of scientific experts in times of need, when advice and knowledge are urgently required. In such instances, the RSC could host an expert workshop charged with summarizing the state of knowledge and the policy implications, much as is done with the National Academy of Sciences in the United States and with the Royal Society of London in the UK.

3. What do you believe should be the primary responsibilities of the CSO?

The key responsibilities that we believe are essential for the CSO are⁵:

- **Formal channels for science advice** – Provide non-partisan advice, analysis, and opinion on any aspect of science to decision makers. Provide authoritative guidance on the interpretation of scientific evidence in light of uncertainty. Communicate to relevant Ministers, Cabinet, the Privy Council Office, or the Prime Minister, as appropriate, about science-based challenges and opportunities as they arise. Ensure that the mechanisms and support necessary are in place for data collection, analysis, and advice on complex issues of policy relevance. Commission an arm's length Expert Panel or convene and Chair a Science and Technology Advisory Committee.
- **Informal channels** – Develop and tap into a network of scientists across Canada and elsewhere. Solicit briefings on the latest breaking science news. Communicate with the public to enhance societal confidence in science and technology. Help build a strong science culture in Canada, in collaboration with the provinces, territories, and

3. Similar to the UK's Council for Science and Technology, the USA's Council of Advisors on Science and Technology, and Germany's Scientific Council (Wissenschaftsrat). The closest Canadian equivalent is the Science and Technology Innovation Council, but this is comprised largely of administrators and members from industry and business sectors, with very few active scientists (only half have Ph.D. degrees, none have M.D. degrees, and many areas of scientific expertise are unrepresented). In addition, STIC deliberations are not open to the public, making it unclear what and how scientific evidence is weighted.

4. RSC Position Paper (<https://www.rsc-src.ca/en/about-us/our-people/our-priorities/royal-society-canada-issues-position-paper-strengthening>)

5. These categories reflect internationally recognized roles of Chief Science Officers (International Council for Science (ICSU) and the Office of the Prime Minister's Chief Science Advisor. 2014. Science Advice to Governments Conference. Synthesis Report. Auckland, New Zealand)

their Ministers of Education. Become a visible and accessible point of contact for policymakers seeking scientific expertise and for the science community seeking to offer knowledge and evidence to government.

- **Urgent decision-making capacity in times of crisis** – Provide rapid evaluation of scientific information in crisis situations, convening essential experts as needed and guide decision-making in an evidence-based manner.

In our opinion, it is critical that the CSO be present upon request at Cabinet and have regular meetings with the Prime Minister (as in the UK) to ensure that science advice is working at the highest levels and that research and knowledge are coordinated among different government and non-governmental agencies.

The CSO should also work together with Provincial counterparts (such as the *scientifique en chef*, Rémi Quirion, of Québec⁶) to ensure collaboration on scientific research, training, and innovation and to share best practices.

In our opinion, key attributes about the person and the position include “unfettered”, “independent”, “respected”, and “committed to evidence-based decision making”. The CSO should have a Ph.D. and a solid scientific background, with extensive past research experience, with a track record of analyzing and interpreting complex scientific issues.

4. What issues should the CSO address first?

Coordinate science knowledge – Multifaceted issues require informed policy and investment decisions, often requiring information that is currently siloed in different agencies (e.g., Stats Canada, NRCan, Environment Canada, Transport Canada, Agriculture Canada, etc.). The CSO should aim to build a stronger data-sharing ethic and practice in Canada, in coordination with the Council of the Federation, to ensure that analysts inside and outside government have access to the best available data to inform these decisions.

Rebalance science spending – Science spending has shifted towards areas with immediate industry relevance (e.g., projects able to obtain matching funds from industry). While this should remain a part of the science-spending portfolio, long-term discovery and scientific capacity require that Canada invest in science whose industrial relevance may not be immediately obvious and whose output improves the lives of Canadians and preserves our treasured natural landscape and seascape, without immediate industrial application. The CSO and the Minister of Science are in prime positions to forge a discussion about how best to achieve balanced science funding.

Investigate lines of information flow – The CSO should launch an investigation into the flow of policy-relevant scientific information both within government and non-governmental agencies. Identifying bottlenecks in this flow of information and eliminating these bottlenecks will ensure that the best evidence is accessible when policy decisions are needed.

Restore knowledge gathering capacity – We commend the government for restoring the long form census. The capacity for agencies such as Statistics Canada, the Department of Fisheries and Oceans, and Environment Canada, and Canadian Heritage to collect, analyze and make available data have, however, been dramatically cut over the past decade. This reduces Canada’s capacity to detect trends, reduce risk, and act upon emerging opportunities.

Investigate the loss of information – Seven out of 11 DFO libraries were closed under the previous government, and the extent to which reports have been lost without back-ups is not publically known. The CSO should launch an investigation to determine what reports were lost and to initiate calls to past and current DFO staff and to other agencies to reproduce lost reports. It may not be too late to regenerate lost data (if indeed this is the case), but the longer we delay the worse this will be.

Develop clear and system-wide policies on the openness of government science – We applaud the “unmuzzling” of Canadian government scientists. To further a spirit of openness, clear guidance is needed about how scientific information can be responsibly conveyed to the public and shared in an open fashion. There are grey areas (e.g., scientific information that put people or endangered systems at risk) and advice on best practices is needed.

Build upon Canada’s early strength in Science Advice – Canada was an early leader in developing a framework for science and technology advice, based on the 1999 SAGE report (“**Science advice for government effectiveness**” ⁷). This

6. <http://www.frq.gouv.qc.ca/en/chief-scientist/message-chief-scientist>

7. <http://publications.gc.ca/site/eng/84765/publication.html>

framework aimed to ensure that: (i) ministers can be confident that science advice is based on a rigorous and objective assessment of all available science; (ii) credible science advice is considered by decision-makers; and (iii) the public and parliamentarians are confident that government is using science in the best interests of society³. We recommend that the CSO modernize and build upon SAGE, taking advantage of the transformations that have occurred in open, reproducible, and synthetic science.

Serve as an ambassador of science to the world – The CSO should also serve as the face of Canadian science on the international stage, championing excellent Canadian research and demonstrating Canada's commitment to cutting-edge scientific research, training, and communication.

SUMMARY

The Royal Society of Canada is extremely supportive of the government's decision to appoint a Minister of Science and of your decision to appoint a Chief Science Officer. We offer our services as a **conduit** for the scientific community to provide advice and raise issues of concern to government and for government to inform the scientific community of decisions and the underlying rationale. We believe that the many Fellows of the RSC, including our College of New Scholars, have the **expertise, interest, and capacity to serve Canada** by convening our relevant expertise, as needed, to evaluate scientific knowledge and to provide rapid-response science briefs.

We very much look forward to working with the Minister of Science and the Chief Science Officer in the future.

Sincerely,



Maryse Lassonde,
President



David Layzell,
Expert Panel Secretary