SPOTLIGHT ON INTEGRITY

AN UPDATE ON THE STATE OF SCIENCE IN BRITISH COLUMBIA

TEJ HEER
KIMBERLY GIRLING

Evidence for Democracy

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By Tej Heer and Kimberly Girling
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Evidence for Democracy is the leading fact-driven, non-partisan, not-for-profit organization promoting the transparent use of evidence in government decision-making in Canada. Through research, education and issue campaigns, Evidence for Democracy engages and empowers the science community while cultivating public and political demand for evidence-based decision-making.

Evidence for Democracy

e info@evidencefordemocracy.ca
t 1-844-335-3339 (toll-free)

evidencefordemocracy.ca

Contents

Executive Summary

In 2017, Evidence for Democracy published *Oversight at Risk*, investigating the state of science in the British Columbia public sector. The report found that BC scientific professionals had concerns about transparency and reductions in research capacity at their Ministries, and made several recommendations to strengthen research capability, communication, and scientific integrity in BC. To update this work, the current survey was distributed to 1235 scientific professionals in the BC public service. It aimed to evaluate changes to science integrity and capacity in BC over the past three years, and understand where improvements can be made.

KEY FINDINGS

- We received survey responses from 323 scientific professionals from 10 ministries that were members of the Professional Employees Association (PEA) on 33 questions related to communication, independence, and capacity for scientific research.
- Since 2017, 38% of scientific professionals feel there has been a moderate or substantial reduction in research capacity, with 23% seeing no change in capacity and 27% an increase in capacity. Overall, 93% of scientists surveyed still believe that the public would benefit from greater professional capacity in the BC public service.
- While the majority of scientific professionals (81%) feel their Ministry has a clear mandate, 48% feel like they lack the capacity required to adequately carry out this profesional mandate in their own role. Scientists identified hiring delays, lack of succession planning, and over reliance on professionals outside the government as core barriers to research capacity.
- Over half of respondents believe that the public service over-relies on external professionals and 49% believe this compromises the ability to use the best available evidence in policy-making.
- Largely (75%) scientific professionals feel that they are able to communicate their science with the public and with other academics, mostly (59%) with permission from their ministries. 58% feel supported to attend conferences; however, many (71%) feel limited from attending international conferences due to funding restraints. Most also feel they have the ability to attend some professional development and training, but 42% feel that advances in their field are occurring at training and conferences that they are not able to attend. Scientific professionals (79%) are in favour of increased time off and funding to attend professional development.
- 60% of scientific professionals feel their expertise is sought out by the relevant policy makers and 43% feel that they are properly credited in their work; however, 43% believe Ministries' ability to develop policies based on the best available evidence has been compromised by political interference. As well, there are some concerns from professionals about a lack of clear processes around how science and evidence are integrated into policy.

RECOMMENDATIONS

Research Capacity:

- Support mechanisms for increasing the number of qualified scientific professionals and improving research capacity in the BC public service. We recommend that Ministries:
  - Improve hiring practices and invest resources for personnel to fill outstanding vacancies and to increase support and technical staff for Ministries;
  - Develop a framework for succession planning that includes measures for training of new employees and reduces hiring delays;
  - Improve the competitiveness of hiring practices to attract qualified professionals, including by providing competitive wages;
  - Explore career laddering options to allow qualified scientific professionals to advance in their positions.

Communications and Training:

- Ensure that qualified professionals can build the skills, knowledge, and connections they need to meet their mandates through increased time off and funding to attend conferences and professional development activities.
- Create clear science communication policies that ensure public sector professionals can speak freely to the media and public in a timely manner.

Scientific Integrity and Independence:

- Develop provincial scientific integrity policies that improve transparency of how science is used in policy, minimize political interference in policy-making, and protect scientific professionals that speak out.
- Implement effective policies that ensure transparency and oversight of external professionals contracted to work for the public service.

Introduction

Government science is an integral part of the health, safety, prosperity, and security of Canada. In British Columbia, public sector scientific professionals conduct important research in fields such as forestry, environmental sciences, sustainability, geosciences, engineering, and health. Provincial scientific professionals work with industry partners, Indigenous groups, and the general public to provide up-to-date information on scientific topics, create regulations, and keep the province connected. The advice and data that scientific professionals provide is a fundamental tenet of evidence-based policy; however, over the past several years, there have been concerns about the ability of public sector scientific professionals to complete research and communicate their results to the public and policy-makers.

Recent challenges to Science in the BC Public Sector

In 2011, the BC government had the lowest number of public employees per capita in the entirety of Canada (Ivanova 2013), due primarily to public sector cuts through the 2000s. These cuts were particularly significant in the science ministries, with a 25% reduction in staff scientists and licenced expert positions (Lupick 2014). Reductions in government science capacity has led to the adoption of a model called "professional reliance" in which non-government professionals are often called to fill scientific and oversight roles in BC (Bertram and Roberts 2013).

Over the past several years, concerns have been raised about the impacts of reduced scientific capacity and the resulting over-reliance on external professionals, such as the potential for professionals to be employed by the same industry that they are regulating and the lack of sufficient capacity for those still employed in the public service to effectively meet their scientific mandates (Haddock 2018, PEA 2014). This is compounded by recent concerns both at the federal and provincial level about government scientists being able to speak freely, and ensure their science is effectively used in government decisions (Lupick 2014, Magnuson-Ford & Gibbs 2014).

In 2017, to better understand these concerns, Evidence for Democracy (E4D) released *Oversight at Risk*, based on a survey of government scientists in British Columbia (Smith et al. 2017). The survey identified a number of challenges to science in BC including a lack of adequate capacity for science within the public service, overreliance on outside professionals, and perceived political interference in the decision-making process. The report made eight recommendations to improve capacity, communication, and independence in BC provincial science.

Science Integrity & Scientific Integrity Policies

Science integrity has three fundamental pillars: capacity, communication, and independence. To research complex issues, scientists must have the research capacity to complete their work to the highest level, which includes having enough resources, personnel, and funding. Scientists must also have the ability to communicate their results freely, without political interference (Carroll et al. 2017). Scientific independence requires that government scientists and their research are independent from project proponents and government interference (Jacob 2018). This also needs to include transparency in how science is used in the decision-making process (Carroll et al. 2017).

Over the past decade, there have been threats to scientific integrity in government science. In the 2010s, the Conservative federal government, led by Prime Minister Steven Harper, was accused of muzzling federal scientists (Douglas 2015, Westwood et al. 2017) by restricting their ability to communicate with the media (CBC 2010, Magnuson-Ford & Gibbs 2014). Concerns were also raised about government cuts to science, leading to reduced research capacity (Barnett & Wiber 2019). Surveys of federal scientists also demonstrated high amounts of perceived political interference in federal research (PIPSC 2013).

Over the past several years a number of steps have been taken to improve scientific integrity in the federal public service. In 2015, the Trudeau Liberals announced new measures to support evidence-informed policy and allowing federal government scientists to speak to the public (PIPSC 2018). This included the implementation of a new position of Chief Government Science Advisor (CSA) (Jones 2017), and announcements of new funding for science and

research in the 2016 and 2018 budgets (Owens 2019). As well, Memoranda of Agreements between the Treasury Board and the Professional Institute of the Public Service of Canada (PIPSC) were struck with respect to Scientific Integrity. The federal government implemented a Model Scientific Integrity Policy which aims to promote integrity in public sector science, improve the ability of scientists to communicate their work and access training, and enhance employee understanding of the contributions of science and research in decision-making. Initiated in 2017 and led by the CSA, the policy is now required to be implemented by all science-based departments.

Recent steps towards Scientific Integrity in BC

In 2018, an independent review of professional reliance in BC was released (Haddock 2018) which contained 121 recommendations to improve regulation and oversight of non-government professionals. This led to the passing of Bill 49 (Professional Governance Act), which addressed two recommendations and created the Office of the Superintendent of Professional Governance to perform oversight on professionals, along with clarifying the roles of non-government professionals. Bill 49 also requires professionals to "maintain competence in relevant specializations, including advances in the regulated practice and relevant science." As scientific professionals require the ability to stay up to date with the latest research, Bill 49 allows for research to be completed at the cutting edge.

In 2018, the PEA created the Professional Reliance Task Force to address some of the recommendations in Haddock (2018). The joint task force is now undertaking meetings

and organizing to create a final report by the end of the year. They are also involved in data collection, including follow-up surveys on the number of public sector scientific professionals. They found that the number of employed public sector scientific professionals has remained similar in 2018 and 2019, well below the levels of 2000 (PEA 2018, 2019).

Due partly to concerns about the scientific integrity of the environmental assessment program, the BC government passed Bill 51 to overhaul the environmental assessment procedure and included measures for oversight of research completed outside of the government. However, the bill received criticism from scientists for providing project proponents with oversight of the majority of environmental assessments (Cox 2018). The PEA, along with academics, have continued to recommend increased transparency in science-based work in BC (Westwood et al. 2019, PEA 2019).

Current Study

To expand on ongoing work, the current study seeks to provide an update on E4D's *"Oversight at Risk"* and investigate the current state of science in the BC public sector. The purpose of this report is to investigate whether government scientific professionals feel any changes have been seen in the research capacity of their Ministry, their ability to communicate their science, and scientific integrity within the Ministry since 2017, and make recommendations on how to further strengthen scientific capacity and integrity in BC.

Who are Scientific Professionals in BC?

Scientific professionals in BC are qualified personnel, as determined in various legislation that must be competent, accountable, and have their work meet a high standard (Qualified Persons Cross-Ministry Working Group 2014). Qualified scientific professionals can either be self-regulating or accredited practitioners. These professionals in BC provide the provincial government with advice, guidance, research, monitoring, and review services (PEA 2014). They can include foresters, engineers, agrologists, geoscientists, geologists, veterinarians, and psychologists, among others (PEA 2014).

For the purpose of this study, research capacity is defined as the resources, knowledge, and ability to complete and practice research.

The Survey

A survey was sent to 1235 PEA members on February 11, 2020 and responses were gathered until March 2020. The survey consisted of 33 questions, modeled on the initial 2017 report. Survey questions covered four major fields: demographic information, research capacity, communication, and scientific integrity.

The survey results are accurate to 4.7%, 19 times out of 20. Given the fact that those interested in issues pertaining to scientific integrity may be more likely to answer the survey, we recognize that response bias may have played a role in survey results.

The Results

Demographics

Scientific professionals who completed the survey were from a variety of ministries

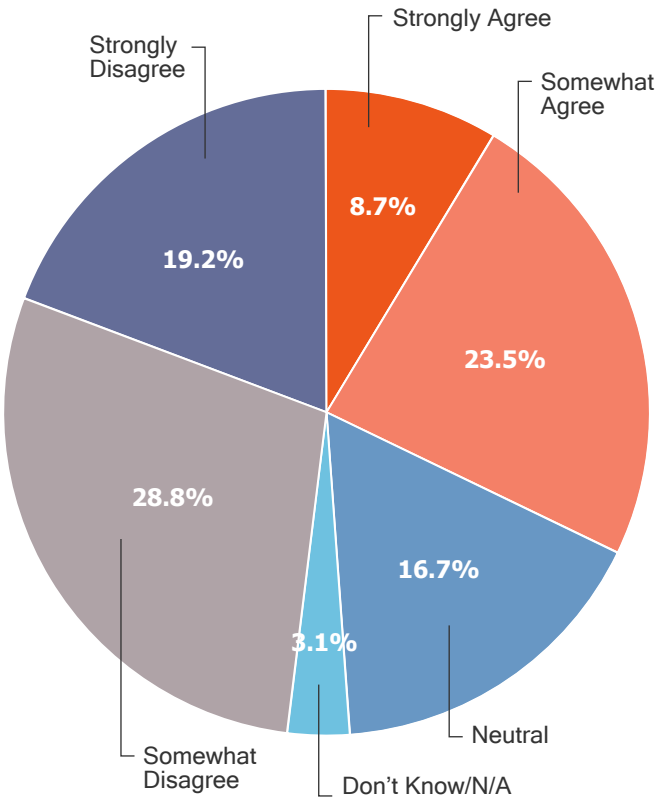
The survey was answered by 323 government scientific professionals, who are members of the PEA. The proportions of the demographic survey were similar to the 2017 survey. Professionals were from 10 ministries (Table 1), most commonly (58%) from Forests, Lands, Natural Resources, and Rural Development. Most professionals indicated that their work mandates cross multiple fields. Specifically, 87% indicated that they sometimes or often work in Environmental Protection and Sustainability, with 68% working in Forestry and 81% in Indigenous Relations and Reconciliation. 57% indicated that they work in Engineering, 61% in Geoscience, and 80% in the development of regulations and policy. Scientific professionals also have a variety of professional classifications, primarily forester (38%), agrologist (21%), and engineer (19%). Professionals have been with the government for a variety of durations, with 49% in the government for less than 10 years and 51% for longer. This includes 22% that have been in a role at the government for longer than 20 years.

Table 1. Responses to survey, based on Ministries. There were 323 responses, representing a 26% response rate.

Ministry	Number of Responses (n = 323)	Total Number (n = 1235)	Response Percentage
Forests, Lands, Natural Resources, Rural Development	186 (57.6%)	757 (61.3%)	24.6%
Environment and Climate Change Strategy	28 (8.7%)	91 (7.4%)	30.8%
Energy, Mines, and Petroleum Resources	28 (8.7%)	88 (7.1%)	31.8%
Transportation and Infrastructure	25 (7.7%)	118 (9.6%)	21.2%
Agriculture	22 (6.8%)	82 (6.6%)	26.8%
Children and Family Development	13 (4.0%)	58 (4.7%)	22.4%
Health	4 (1.2%)	22 (1.8%)	18.2%
Municipal Affairs and Housing	1 (0.3%)	1 (<0.1%)	100%
Indigenous Relations and Reconciliation	1 (0.3%)	9 (0.7%)	11.1%
Public Safety and Solicitor General	1 (0.3%)	1 (<0.1%)	100%
No Answer	14 (4.3%)	N/A	N/A

Research Capacity in the BC Public Sector

Figure 1. My Ministry has enough resources and personnel for research to effectively complete its Mandate

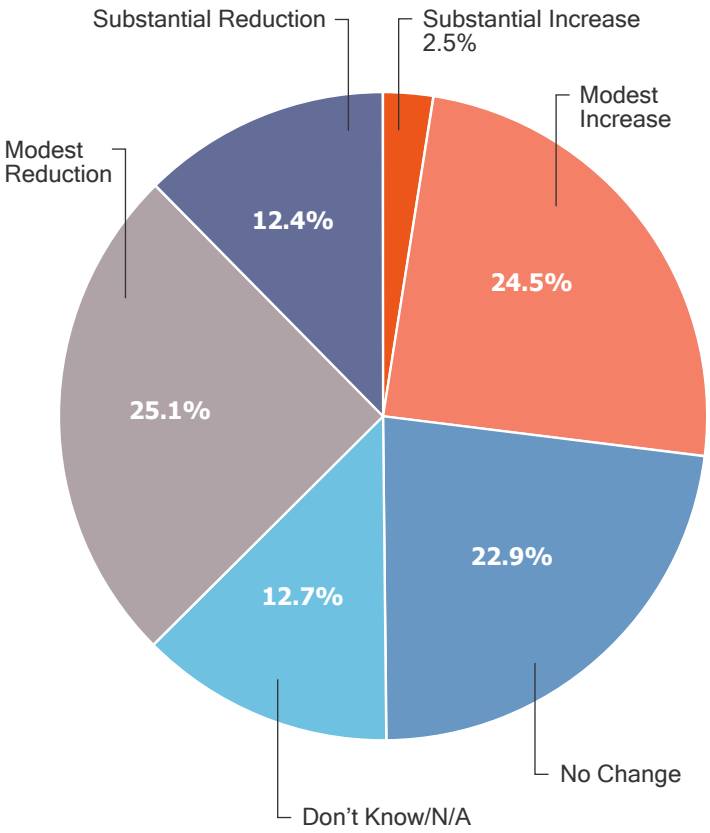


Scientific professionals largely agreed that their Ministry had a clear mandate, yet they identified that research capacity was limiting their ability to complete the mandate

81% of surveyed scientific professionals said their Ministry had a strong and clear mandate; however, 48% feel the Ministry does not have enough research capacity (e.g. scientific staff, and/or resources) to fulfill the mandate (Figure 1). In line with this, 48% feel they personally did not have enough capacity to adequately carry out their professional or scientific mandate.

Since the last survey three years ago, 38% of survey respondents feel there has been a decrease in research capacity in their ministry, with 27% seeing an increase and 23% seeing no change (Figure 2). The split between respondents indicates that there have not been universally clear benefits seen by everyone by recent initiatives to improve capacity, although improvement may exist in some areas. Professionals identified that this lack of capacity is leading to over-working of current government professionals, as well as an over-reliance on outside professionals. According to surveyed professionals, these challenges may have negative impacts on the ability of the Ministry to complete their mandate.

Figure 2. Over the past three years how would you characterize changes in applied science or research capacity in your branch or division?

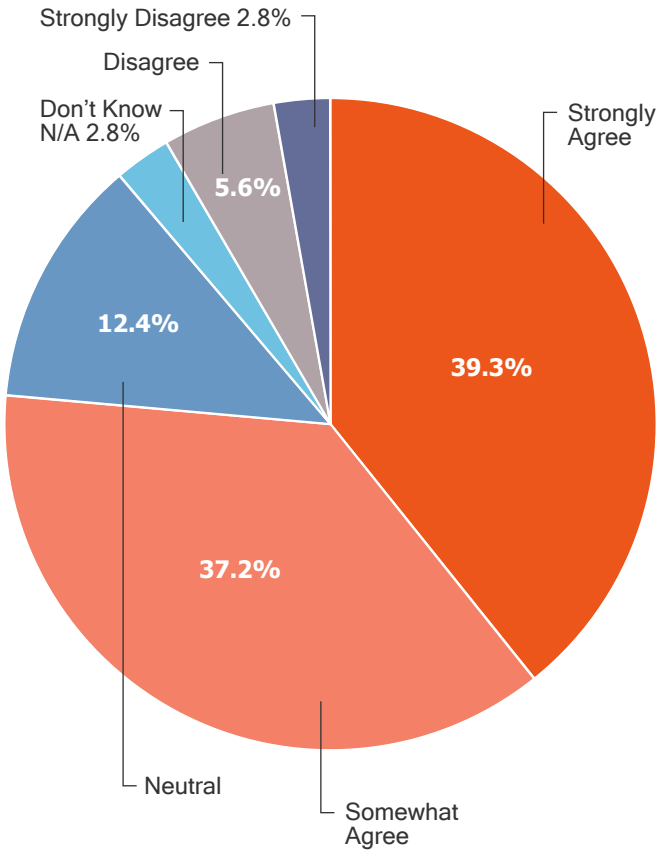


Specifically, 76% of respondents feel that vacant positions or hiring delays were affecting the ability for their Ministry to fulfill its mandate (Figure 3). Comments from the respondents highlighted a need for succession planning in government hiring to retain critical capacity. For example, one professional suggested their Ministry should "create overlap in the hiring process when people retire, hire new staff before people retire and have the retiree train the new staff." There were also concerns raised about the need for more competitive salaries and for hiring more technical and administrative staff to support research professionals.

"Salary levels are well below the North American average for my position so it is hard to attract experienced new hires and hard to retain good talent."

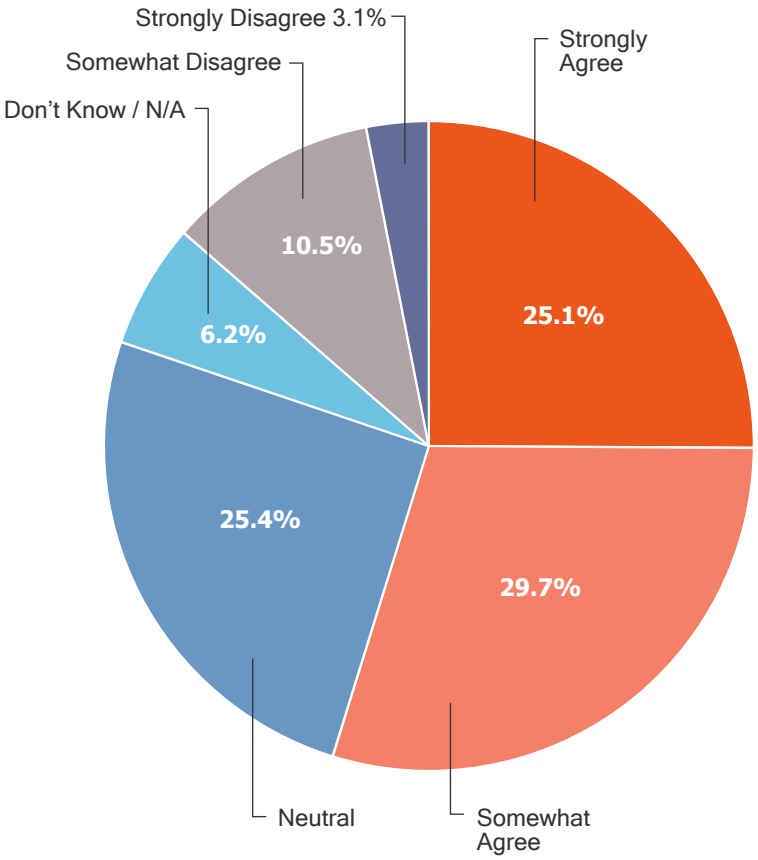
"[Ministries should] Fill out vacant positions which will reduce workload and improve mental health, and work output."

Figure 3. Vacant positions or delays in hiring are affecting the ability of my Ministry to fulfill its mandate



In 2017, *Oversight At Risk* confirmed that government scientific professionals felt there was an over-reliance on outside professionals. The current study indicates that this is still an outstanding issue, with 55% agreeing that the province over-relies on professionals outside the government (Figure 4) and 49% believing that this compromises the ability of their ministry to use the best evidence. Comments provided by respondents indicated the use of outside professionals was due to a lack of resources within the Ministries. Some reported very positive experiences working with outside professionals; however, some felt their Ministries lacked the ability to successfully provide oversight to the work done by outside professionals, which could compromise scientific integrity or the use of evidence in decision-making. One surveyed professional commented that "My branch lacks capacity and technical knowledge to adequately review all the engineering documents that are forwarded to us for regulatory approval". Another noted that over-reliance on external professionals led to the government making "decisions that benefit large corporations at the expense of social, public and environmental interests."

Figure 4. I believe the provincial government over-relies on professionals outside of the public service for scientific or expert evidence and advice

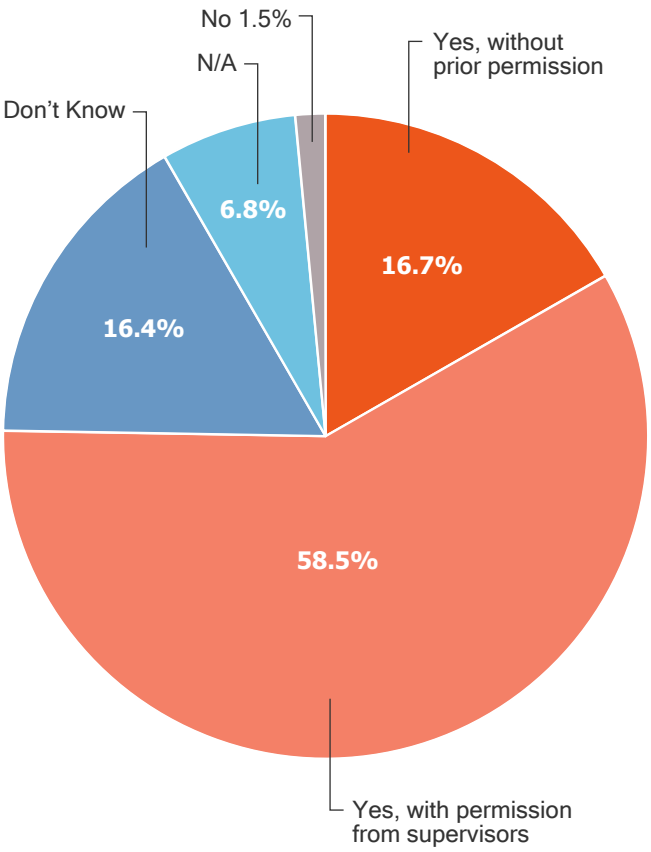


"Reliance on a proponent's hired environmental and forestry professionals that place their clients' interests over that of the general public."

Scientific professionals surveyed overwhelmingly (93%) agreed that the public would benefit from greater government qualified professional capacity.

Communication and Professional Development

Figure 5. I am able to give public or academic presentations on my Ministry-related work



Many scientific professionals felt they could share their work and participate in professional development but challenges still exist

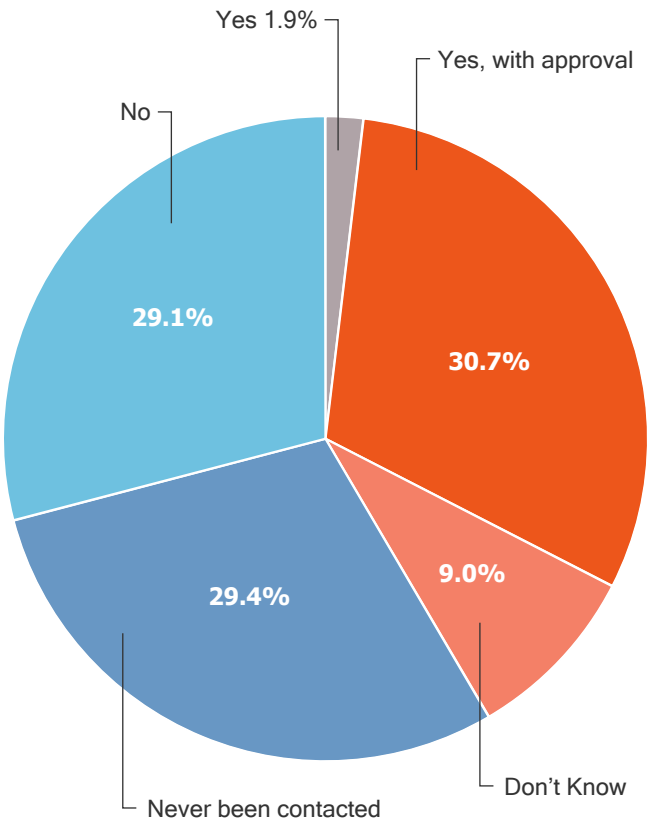
Overall, scientific professionals in the BC public service felt that they had opportunities to communicate their work, and participate in training opportunities. 75% of professionals feel they can give public or academic presentations on their work, albeit 59% require explicit supervisorial permission (Figure 5). Most (58%) can attend conferences and professional development, although 34% and 25%, respectively, reported they can not.

Attendance at conferences and professional development opportunities are an important component of ensuring researchers stay current on advances in their fields and support the Ministry in staying up to date on the latest science. The survey demonstrated that 51% of scientific professionals believe that their training provided them with adequate opportunity to stay current, with 29% disagreeing. High levels (71%) can not attend international conferences and 42% feel advances in their field were happening at conferences that their employer did not provide access to.

"It was not policy that prevented me from participating [in training/conferences], but the overwhelming workload."

Comments raised concerns about lack of funding to attend conferences, as well as the difficulty in making time to attend available professional development. Some scientific professionals reported having to use vacation time to attend these conferences. This led to difficulty maintaining professional accreditations, which require certain amounts of hours of professional development. This was compounded by challenges to capacity, with professionals feeling unable to participate in professional development due to being overworked. 79% agree that an annual stipend and time off would let them stay current on advances in their field. One professional stated that "Being able to attend face to face conferences where you can discuss findings directly with the researcher and develop those contacts is vitally important."

Figure 6. If the media contacts me, I am allowed to speak with them

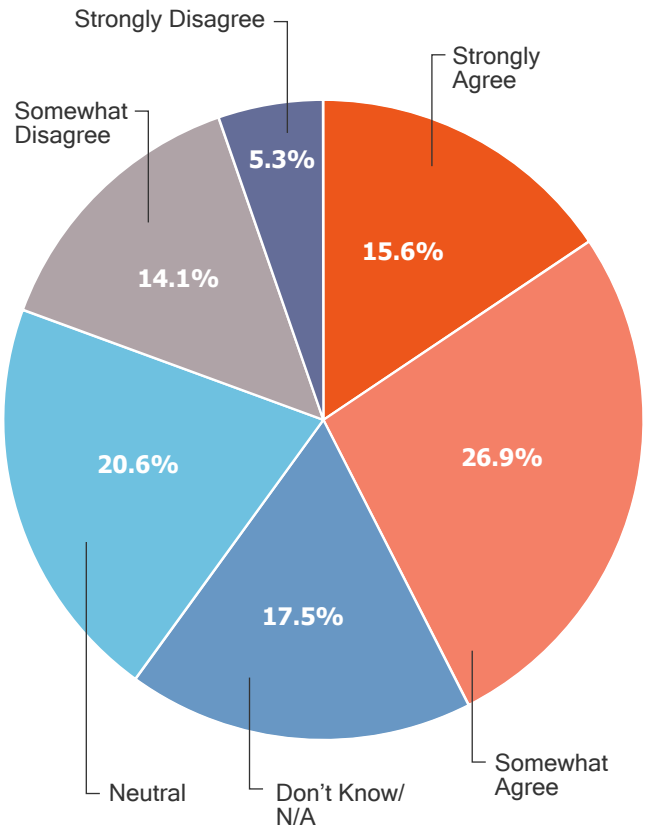


"Any professional development (courses, conferences, workshops) generally must be paid for by myself and on my own time (use vacation). I am able to attend conferences only if I am presenting at them."

Scientific professionals were split on whether they were able to speak to the media. 33% of professionals feel that they could, yet only 2% without permission (Figure 6). Similarly, 29% have never been contacted and 29% can not speak with the media, if contacted. As scientific integrity requires that scientific professionals are able to publicly communicate their findings, it is of concern that a substantial number of professionals still feel unable to communicate with the media, if contacted. Scientific professionals reported high levels of ability to collaborate with external agencies (92%) and colleagues outside of the government (89%). They felt they are able to share their work with the public (67%), as well as participate in advocacy without fear of retribution (52% agreed, with 16% disagreeing).

Independence

Figure 7. My Ministry's ability to develop policies, laws, and programs has been compromised by political interference



Scientific professionals feel their advice is sought, but raised concerns about political interference in the decision-making process.

Scientific independence requires that research can be completed and presented without interference from outside parties. In the public service, this also requires a clear and transparent process for the use of science in creating evidence-based policy. With regard to the use of science and science advice in government processes, 60% of scientific professionals feel their advice and expertise was actively sought out by the decision-making department or agency and 50% believe that they had adequate opportunity to inform relevant policy and decision-making. 43% agree they were properly credited for their work, with 22% disagreeing, and 41% agree that if they identified issues to their manager, it would be adequately communicated to senior levels of government, with 26% disagreeing.

While many scientific professionals felt they were consulted about their work, concerns were raised about political interference in their ministries, with 43% agreeing (and 19% disagreeing) that development of policy, laws, and programs based on the best available evidence was compromised by political interference (Figure 7). This is a slight

improvement from 49% in 2017, but still indicates a substantial amount of scientific professionals feel there is a problem. Examples of political interference provided include elected officials changing or suppressing science, because the findings would be politically unpopular, and industry contacting senior Ministry officials to influence policy development and implementation. One scientific professional provided an example where the professional "had recommendations and directions made based on scientific knowledge and best practices overturned because the MLA in the region did not like the repercussions (i.e. loss of votes)."

"Key legislation has been significantly changed (to the detriment of the public) in response to industry pressure."

Troublingly, 25% of scientific professionals have knowledge of information being suppressed or declined by their Ministry and leading to misleading impressions by the public, industry, or government officials. One professional stated that "industry has the ability to directly contact the Minister or Senior executives to influence policy development and implementation." 38% of those surveyed also believe they could not share concerns with the media or public about a policy that was detrimental to the public interest due to fear of retribution or censure. However, 50% agree (with 17% disagreeing) that being in the PEA allowed them to speak more freely.

"[My Ministry is a] top down organization, so only the "party line" can be issued in public."

Recommendations

The results of the survey indicate there is room for improvement within Ministries in BC with regard to science. The main concerns revolved around the lack of capacity in the ministries to complete their mandates, particularly regarding the number of internal qualified professionals, the lack of resources to attend conferences and professional development, and concerns about scientific independence and integrity. Based on these findings we are making eight key recommendations for how BC's Ministries can address these concerns.

> "Our Ministry, or at least my branch, simply does not have enough capacity (i.e., human resources with scientific skill set) or support (professional development, e.g., attending conference) to protect the environment and human health or deliver on our mandate."

Research Capacity

Since the 2017 survey, initiatives have been undertaken to address the research capacity and scientific integrity problems identified. Unfortunately, even with recent progress made towards increased research capacity in BC, the survey indicated that scientific professionals remain concerned about the lack of research capacity within ministries and thought it was hindering the ability of the Ministries to fulfill mandates. One major concern highlighted was the lack of hiring to fill current vacancies. In addition, scientific professionals noted they are often overworked due to a lack of technical and administrative support. Completing this work reduces their ability to complete research and reduces the capacity of the ministry. To address the problems and to help ease the workload on government scientific professionals, we recommend:

- **Improved hiring practices and investment in resources for personnel to fill outstanding vacancies and to increase support and technical staff for Ministries.**

Scientific professionals indicated that some of the hiring delays are due to scientific professionals retiring, without a plan to hire someone to replace them or to train the new hire. This leads to a loss of the transfer of knowledge and hinders the ability of the new hire to complete their job. We recommend:

- **Developing a framework for succession planning that includes measures for training of new employees and reduces hiring delays.**

The framework should incorporate clear deadlines for filling vacant roles, as well as mechanisms for retiring staff to train their replacements to ensure a transfer of knowledge.

Scientific professionals indicated that salaries being offered to new hires were below industry standards, leading to difficulty in hiring and retaining qualified candidates for positions. To ensure that the government is hiring the most qualified researchers, we recommend using:

» **Competitive hiring practices to attract qualified professionals, including by providing competitive wages.**

In addition, many positions in the public service currently do not offer opportunities for advancement, without applying for a new role. This can cause human resources delays, and could make positions less desirable for qualified professionals. To support retention and attract professionals we recommend that the government:

» **Explore career laddering options to allow qualified scientific professionals to advance in their positions.**

In light of the COVID-19 pandemic, ensuring that the public service has adequate numbers of qualified scientific professionals will be essential, to ensure public health and safety, provide scientific advice, and to rebuild the economy. In an unstable economic future, the above recommendations can also help attract highly qualified personnel to desirable careers in the public service, at a time when scientific professionals are especially critical.

Communication

Despite Bill 49 mandating that scientific professionals should be able to keep up with professional development, the survey results indicated some scientific professionals are still struggling to attend all of the professional development required to excel at their job. A prominent factor is scientific professionals being overworked and not having time to complete development. Similarly, professionals are allowed to attend local conferences, but indicated there is a lack of funding available to support them in doing so. Conferences are needed for scientific professionals to learn about advances in their field and share their research with other academics and researchers in their field. Scientific professionals agree that increased time off and an annual stipend would help. Therefore, we recommend that Ministries:

» **Ensure scientific professionals can build the skills, knowledge, and connections they need to meet their mandates through increased time off and funding to attend conferences and professional development activities.**

Although most scientific professionals can communicate to the public and media, a substantial amount indicated they were still not allowed to speak with the media, even with permission. As scientific integrity requires scientific professionals to be able to communicate freely, we recommend that Ministries:

» **Create clear science communication policies that ensure public sector scientific professionals can speak freely to the media and public in a timely manner.**

This policy can be based on similar policies created by the federal government.

Independence

The ability of science to remain independent from outside pressures benefits the public by providing the best available science advice. Scientific professionals reported incidents in which there was political interference that suppressed or altered results to the detriment of the public. They also indicated a level of fear of reprisal or censure if they speak out against policies that will be detrimental to the public. To maintain the ability of independent research to be conducted and presented, as well as the ability of scientific professionals to speak freely, we recommend:

» **Development of provincial scientific integrity policies that improve transparency of how science is used in policy, minimize political interference in policy-making, and protect scientific professionals that speak out.**

These policies could also be similar to the Model Scientific Integrity Policy developed by the federal government. This should include explicit mechanisms for how science advice is used in the public service to ensure science and evidence are well integrated.

Similar to other reports and surveys, scientific professionals agree that there was a potential over-reliance on outside professionals, leading to a detriment in research capacity in the government. While this can be improved with increased research capacity, mechanisms for oversight do need to be in place, as public sector scientific professionals expressed worry that they were not able to adequately review the work of external professionals. Hence, we recommend that Ministries:

» **Implement effective policies that ensure transparency and oversight of external professionals contracted to work for the public service.**

Conclusion

Since Evidence for Democracy released *Oversight at Risk* in 2017, efforts have been made to address the recommendations regarding scientific research capacity, communication, and independence. The results of the current survey indicate that it is unclear if these benefits have led to large-scale changes in the BC government. The recommendations of this report are similar to those made in *Oversight at Risk*, indicating that the identified problems have not been fully addressed and that there is room for progress to be made. The results and recommendations of this report can act as a blueprint to improving scientific integrity within the BC Ministries.

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