



Mr. Lloyd Longfield, M.P.
Chair
Standing Committee on Science and Research
House of Commons
Ottawa, Ontario K1A 0G6

Dear Colleague:

Pursuant to Standing Order 109 of the House of Commons, I am pleased to submit on behalf of the Government of Canada (the Government) the response to the sixth report by the Standing Committee on Science and Research (the Committee) entitled *The Role and Contribution of Citizen Scientists* (the Report), which was presented to the House of Commons on November 7, 2023.

Citizen science, sometimes called participatory research science, is a collaboration between members of the public and professional scientists in research projects. The Government recognizes the important role citizen science plays in fostering a more vibrant science and research ecosystem in Canada. The Government expresses its gratitude to the Committee and its staff for undertaking this timely and important study on the role and contribution of citizen scientists, as well as the many witnesses who shared their knowledge and passion through expert testimony and written briefs. The Report provides informed insights to the Government and describes the positive impacts of citizen science from both scientific and societal perspectives. It also examines success factors and how the Government can better support citizen science in Canada.

The Report's recommendations are to better integrate citizen science data in research programs, enable citizen science projects on federal lands, increase public communication efforts, include civic engagement in research funding evaluations, and increase funding to enhance the capacity of organizations conducting citizen science projects. The Government acknowledges and supports these recommendations, which are strongly aligned with existing federal policies, programs and investments, and recognizes the opportunity and value in a more robust integration of citizen science in Canada's science and research ecosystem.

In today's digital era, a growing number of federal departments and agencies are realizing significant scientific and societal benefits when leveraging citizen science data and insights. The use of citizen science in a federal context carries

...2

considerable potential for the Government of Canada to collaborate coast to coast to coast with diverse stakeholders to address common interests and goals. This includes academics, non-governmental organizations, Indigenous Peoples, provinces and territories, and the public who bring to the table their own lived experiences.

The Government Response to the Committee's Report and recommendations was prepared by Innovation, Science, and Economic Development (ISED) in close collaboration with Environment and Climate Change Canada (ECCC), Parks Canada, Health Canada, Public Health Agency of Canada (PHAC), the Canadian Space Agency (CSA), Natural Resources Canada (NRCan), Agriculture and Agri-Food Canada (AAFC), and Laboratories Canada through Public Services and Procurement Canada (PSPC). After closely studying the Committee's five recommendations, the Government's response to each recommendation is provided below.

Recommendation 1: That the Government of Canada support citizen science by optimally integrating the data and results of citizen science projects into its own research programs.

The Government accepts the Committee's recommendation that citizen science data and results of citizen science projects be optimally integrated into federal research programs. The Government will continue to support the underlying objectives of this recommendation by working to strengthen the integration of citizen science in federal research programs. A growing number of federal departments and agencies are realizing great benefits when leveraging citizen science data/insights. While citizen science has traditionally been applied in observational contexts, including popular bird, water, and forestry watch programs, more recently the potential of citizen science is being considered in an increasing number of other contexts. For example, citizen science has been recognized as an approach that can be leveraged more fully to fill key data gaps and acquire data that is representative of the diversity of Canada's population to help ensure that decision making is relevant and appropriate for all Canadians. It is important to note that certain fields of science are not naturally conducive to participatory research and, as such, citizen science is not equally relevant across all scientific research domains and disciplines. Below are examples of federal departments and agencies already working to integrate citizen science data and projects into their programming.

Environment and Climate Change Canada (ECCC)

ECCC plays a leadership role in the delivery of many citizen science programs, some coordinated directly by the department and others supported through financial contributions to collaborators that contribute directly to departmental

science and decision-making. These include a diverse range of bird monitoring programs, some running for more than half a century, that engage and leverage the expertise of thousands of skilled birders. Some examples include the North American Breeding Bird Survey, established in 1966; the Christmas Bird Count underway for more than a century; marsh monitoring programs; breeding bird atlases; the Canadian Migration Monitoring Network; and eBird. ECCC ensures that programs that they coordinate support Canadians in both official languages, and that the results are considered and incorporated into departmental decision-making, including assessing the state of Canada's birds, preparing status reports, identifying key biodiversity areas, evaluating conservation actions, and many other activities. ECCC also prioritizes efforts to make the data from these programs openly available to Canadians, while respecting the rights of the data contributors to ensure privacy and appropriate ownership.

While ECCC's citizen science efforts within wildlife areas are the most well-known, there has also been a long history of participatory research in weather and water quality monitoring. Through the Meteorological Service of Canada (MSC), ECCC supports the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) Canada, which involves citizen efforts to measure and report precipitation. ECCC also supports the SmartIce project and SIKU app, which involve community-based ice thickness and environmental observations in northern Canada. The Canadian Aquatic Biomonitoring Network (CABIN) is another successful example of participatory science. CABIN has been recognized as a model for the effective transition of research to operations, engaging and enabling community and citizen science through standardization, training, and data-sharing. ECCC scientists developed the data collection protocols and provide the training and certification for aquatic ecosystem data gathered across the country. Since it was initiated 17 years ago, CABIN has grown to a national network of 1,800 users, with 77% of these users from outside the federal government.

Natural Resources Canada (NRCan)

NRCan also contributes to the integration of citizen science initiatives, and by extension its data and results, into its research programs. NRCan integrates citizen science in a diverse range of its research programs and initiatives across various sectors. For example, Budworm Tracker is a community science program that helps monitor spruce budworm moth populations throughout the forests of eastern Canada, aiding data collection for the Early Intervention Strategy for Spruce Budworm program. Citizen scientists fill a vital role in tracking budworm populations by conducting field research in their own communities. There are hundreds of Budworm Trackers in New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, Quebec, Ontario, and the state of Maine. Budworm Tracker promotes a greater understanding of forest science through the active engagement of the average Canadian.

The Moth Wall Project is another community science program that helps to track the distribution of moths across the country in an effort to study climate change and other disturbances over time. The project aims to engage the public about moths which are an important, largely night active insect group, while collecting valuable data on the distribution of species and flight times. There are now moth walls in all national parks in Atlantic Canada, where citizen scientists can observe, take pictures, and post to iNaturalist. The walls have already resulted in two new provincial records—two moth species that are new to the range where they were found—one in Prince Edward Island and the other in Newfoundland and Labrador. More recently, following the discovery of the Elm zigzag sawfly in 2020, an exotic species new to North America, NRCan engaged Canadian and American citizens to map out its distribution. Calls were made to the public through traditional media, social media, and mobile applications such as iNaturalist to confirm the insect's presence in new regions.

NRCan integrates citizen science across a diverse range of research programs, from tracking various species dispersion to climate change geoscience projects to better understand their impacts on affected communities. NRCan also integrates citizen science in projects involving engagement with Indigenous peoples. For example, NRCan's scientists are working with Ikaarvik, an independent, Indigenous-led non-profit organization where Northern youth work to bridge research and communities, Indigenous knowledge, and Western science. Additionally, NRCan's Canadian Hazards Information Service (CHIS) facilitates the integration of citizen scientist data and results through a felt earthquake online questionnaire. NRCan uses community-based approaches as part of their climate change geoscience work. For example, one current project includes community-based monitoring of the impacts of climate change on coastlines in the Arctic, specifically around Tuktoyatuk.

Agriculture and Agri-Food Canada (AAFC)

Agroclimate Impact Reporter (AIR) is an online survey that allows agricultural producers to report on the impact of weather and climate conditions and events in their region. The data is compiled into interactive maps, informing scientists, the agricultural sector and the general public about conditions in particular areas and across Canada. The information helps scientists identify developing agroclimate trends as well as visualize the extent of agroclimate impacts to the sector. Other citizen science-based organizations also contribute to AIR, such as the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS). AAFC also supports the Prairie Pest Monitoring Network, a coordinated insect pest population surveillance program in field crops in the prairies. The data gathered is correlated with climate, weather, agronomic practices, and natural enemies, allowing scientists to forecast insect pest populations and better understand the effect on crops. Another example is AAFC's ongoing biological collections

digitization initiative, in which citizen science volunteers transcribe valuable biodiversity data from specimen labels. This collaborative approach is helping AAFC speed up the digitization of the millions of specimens in its collections of living and preserved biological material (insects, plants, fungi, bacteria, and nematodes) for scientific research and discoveries.

The Canadian Food Inspection Agency (CFIA)

Integration of citizen science data is also supported by CFIA. Specifically, its plant health program integrates public sightings of suspected plant pests through reporting via CFIA's website and other reporting apps such as iNaturalist and EDDMapS. Collectively, this data is used to support CFIA in planning its monitoring and surveillance activities to maximize its chances of responding quickly to new plant pest incursions. Additionally, the Unit has led community-based monitoring programs for plant pests of concern, such as box tree moth and hemlock woolly adelgid, whereby traps and lures are purchased for volunteers to set up at their properties. The contents of these traps are then analyzed by CFIA, which helps to guide CFIA's actions if plant pests are detected. A series of pest detection cards have been developed for broad-scale distribution to foster awareness of pests of concern and encourage reporting to support early detection and rapid response. CFIA also supports the Finfish Health Tracker, which uses citizen science data to inform surveillance and research needs of the agency. Animal health researchers and scientists rely heavily on the data from certain citizen scientist platforms to assist with studies on risk intelligence, early warning and surveillance purposes.

The Public Health Agency of Canada (PHAC)

PHAC leads the FluWatchers program, a citizen science component of Canada's national influenza surveillance program. FluWatchers is one of several facets of a comprehensive respiratory disease surveillance system, which includes geographical spread, laboratory confirmed detections, outbreak surveillance, severe outcome surveillance, strain characterization and antiviral resistance testing, and vaccine monitoring. This participatory public health surveillance system invites volunteer FluWatchers to respond to a brief and anonymous weekly survey, providing observations on whether they, or members of their household, have experienced a cough or fever over the preceding week. This model of community-based syndromic surveillance enables flexible, low-cost, and sensitive detection of disease circulation in communities; it was rapidly scaled up to address COVID-19 transmission and provided near-real-time indicators of the burden of illness across Canada. The contribution of FluWatchers in Canadian communities mitigates some of the known limitations of traditional disease surveillance systems that rely on clinical and/or laboratory diagnoses, and contribute to providing up-to-date and local information about

disease transmission for the public and the healthcare system. Since the beginning of the COVID-19 pandemic, over 21,000 FluWatchers have responded to questionnaires, providing real-time, low-cost data to inform public health responses.

Health Canada

Health Canada leverages citizen science data to better understand exposures to indoor and outdoor air pollution. For example, Health Canada has partnered with the British Columbia Centre for Disease Control to send out air sampling kits containing low-cost air quality monitors to daycares, long-term care facilities, and hospitals to better understand exposures to wildfire smoke among disproportionately impacted populations. The results of this monitoring were made available to participating centres in real time.

Health Canada has included a commitment in Canada's fifth National Action Plan on Open Government (2022–2024) to support the development of necessary infrastructure, including guidance, capacity building, and information technology, to better enable citizen science more effectively in a health context. To support this effort, Health Canada is leading interdepartmental coordination on citizen science to benchmark researchers' needs, and develop guidelines and standards to ensure safe, secure, and responsible collection, management and analysis of participant data and contributions. They are exploring how to streamline processes, simplify public access, and increase the ease of use of the results in government projects across the federal science ecosystem.

Laboratories Canada

As Health Canada's interdepartmental citizen science community has matured, they have partnered with Laboratories Canada to explore enterprise-wide support to integrate citizen science and community data in federal research. As citizen science is inherently a collaborative endeavour, Laboratories Canada seeks to streamline and promote citizen science horizontally through two program pillars: (1) digital enablement and (2) reducing barriers to science collaboration in the federal science ecosystem.

Recommendation 2: That the Government of Canada support citizen science projects on the lands it manages, including national parks and national urban parks.

The Government accepts the Committee's recommendation. The Government recognizes the importance of citizen science as a means of gathering information on the cultural and natural world, leveraging the skills of an increasingly

science-literate public, enhancing visitor experience, and promoting a conservation ethic among Canadians. Parks Canada and ECCC are undertaking a number of important activities in this regard, as summarized below.

Parks Canada is responsible for protecting Canada's vast national parks, and for managing them for visitors to understand, appreciate, and enjoy in a way that does not compromise the parks' ecological integrity and culture heritage. Parks Canada recognizes that citizen science has the potential to support various aspects of the establishment and management of the sites, and provides benefits in terms of citizens and visitor experience. Parks Canada uses public consultations, which include targeted activities with citizens and communities and in particular Indigenous communities to ensure citizen scientists are welcomed and encouraged to share their knowledge and interests. Parks Canada also informs the development of its programs by consulting citizens. For example, the Ecological Corridor program reaches out to Canadians to identify national priority areas and the criteria used to define these ecological corridors. Information provided by citizen scientists also supports the management of heritage areas in Canada.

In national parks administered by Parks Canada, a broad variety of site-level management activities benefit from the involvement of citizen scientists, such as assessing and controlling threats like pollution by cleaning shores and obtaining data on plastic pollutants to surveys and detection of invasive species. For example, Gwaii Haanas National Marine Conservation Area Reserve and Haida Heritage Site has a marine pollution indicator where field sampling for sediments, blue mussels and microplastics along with laboratory processing and analysis are conducted in collaboration with the Ocean Wise Pollution Tracker program.

Parks Canada often involves local communities in the management of its sites through "Friends" groups. For example, Rouge National Urban Park collaborates with the Friends of the Rouge Watershed for various wildlife surveys.

Collaboration between Parks Canada and citizen scientists is more likely to succeed over the long term when the values, interests and needs of Indigenous partners and local communities are met. Most notably, the management and monitoring of species at risk and species of cultural and ecological importance is strongly enhanced when local communities are involved from the onset, are empowered to provide their expertise, and the results are useful for the community. For instance, Parks Canada collaborates with Fisheries and Oceans Canada (DFO) and Société des établissements de plein air du Québec (Sépaq, the Quebec parks provincial agency) to monitor fish communities in the Saguenay Fjord based on data provided by citizens, which informs DFO's scientific assessments of fish stocks and fishing quotas of the winter recreational fishery. Parks Canada is also looking into innovative approaches to further involve citizen scientists, notably using new technology and crowd sourcing.

Many federal departments engage with citizen scientists. Complex issues, such as climate change and biodiversity challenges, require greater collaboration involving multiple partners and interested parties, including Indigenous organizations and communities, academia, not-for-profit organizations, industry, and governments. In recent years, Parks Canada has undertaken efforts to promote and raise awareness of its conservation and science programs among Canadians. Through this work, Parks Canada has seen an increased public interest in, and desire to learn more about, conservation and to be involved in more tangible ways. This is where citizen science efforts represent a significant opportunity to involve Canadians in conservation and foster a higher level of understanding and support for solutions to tackle pressing environmental and cultural challenges. To realize this opportunity, Parks Canada will continue to explore how to better leverage citizen scientists and citizen science approaches in its policies and programs.

In addition, **ECCC** plays a leadership role in delivering many citizen science programs, and recognizes the value of engaging citizen scientists to support or supplement monitoring on all federal lands, including National Wildlife Areas (NWA) and Migratory Bird Sanctuaries (MBS) that are managed by ECCC. Many national bird-monitoring programs, such as the North American Breeding Bird Survey and eBird, already provide some coverage on NWA and MBS as well as a range of other federal lands. A few monitoring programs involving citizens take place largely on federal lands. For example, the migration monitoring undertaken by the largely volunteer-driven Prince Edward Point Bird Observatory, takes place within an NWA. ECCC is evaluating the potential contribution of citizen science to complement other programs in support of monitoring of ecological integrity within protected areas.

Recommendation 3: That the federal government invest more in its public communications efforts to encourage participation in citizen science projects.

The Government accepts the Committee's recommendation and agrees with the Report's observation that "citizens across the country have a great interest in science." The Government is already working to highlight the importance of broad science literacy for both adults and young people in its communications activities. Engaging Canadians in government-led scientific research is a way to enhance public trust in federal science-related decision-making and help combat the growing mis/disinformation infodemic.

Creating opportunities for, and encouraging Canadian residents to, participate in citizen science advances federal government commitments to open science, as outlined in the Office of the Chief Science Advisor's Roadmap for Open Science (February 2020). Citizen science activities support principles of open science,

including inclusiveness, collaboration, and sustainability, and contribute to fostering public dialogue about, understanding of, and confidence and trust in science. With parallel initiatives such as the Federal Open Science Repository of Canada, the Citizen Science Portal can improve public awareness of and engagement with federal science activities and outputs across all stages of the research process.

The Government uses various tools to communicate with the public about opportunities to participate in citizen science projects. For instance, established in 2017 at the request of the Minister of Science, the Citizen Science Portal is an online hub that focuses on science literacy, outreach, and education. Available online at [Science.gc.ca](https://science.gc.ca), the Portal is a central location where Canadians can find information about citizen science projects that are seeking participants. It also allows researchers to increase the visibility of their projects and reach a broader audience. Projects include those led by scientists and researchers at federal departments and agencies, as well as other organizations, including universities and colleges, provincial organizations, and not-for-profits. All projects are either Canadian or open to Canadians, and the data collected is used for public science purposes. As of November 2023, there are 56 projects listed, with 20 of those affiliated with federal Government science-based departments and agencies. Topics include wildlife, health, nature and the environment, agriculture, and the weather, though projects on other subjects are eligible and welcome. This portal provides a central platform for projects benefiting from broad public visibility, which is complemented by targeted efforts and stakeholder outreach by departments and agencies to promote initiatives with more specialized needs.

The Government also uses social media to promote various citizen science programs. It encourages collaborators to promote their citizen science programs, ensuring that all federally supported programs are promoted and made available in both official languages. The Government will continue to assess its public communications efforts to encourage participation in citizen science projects and including partnerships to feature and promote initiatives involving participatory research.

The results of a recent public opinion research carried out by **Health Canada** revealed that a majority (81%) of surveyed Canadians are at least moderately interested in participating in a future government-led participatory research or citizen science project. This was largely motivated by a desire to advance society, science, and their community. Misinformation and the spread of inaccurate scientific information were identified specifically as a significant concern for surveyed Canadians, with more than nine in ten either strongly or somewhat agreeing that they are concerned with the spread of inaccurate scientific information (94%) and over eight in ten strongly or somewhat agreeing they are interested in taking action against inaccurate scientific information (82%).

AAFC uses various approaches to actively promote AAFC's citizen science projects, encourage participation, and raise awareness. This includes the development of a wide variety of public-facing communications products featuring citizen science projects (e.g., scientific achievement articles, videos, podcasts, website content, etc.). Recent examples include a podcast on the Agroclimate Impact Reporter, as well as a scientific achievement article on AAFC's continued digitization of biodiversity data, involving over 1,800 citizen science volunteers. These communications products are actively shared through the department's social media channels, on common Government of Canada resources such as the Citizen Science Portal, and with appropriate media outlets or campaigns (e.g., Citizen Science Month campaign, Agroclimate Impact Reporter, and others).

The **CFIA** produces a series of pest cards and posters for large-scale distribution, fostering awareness and promoting the reporting of priority and emerging pests in Canada, which are distributed through the CFIA's networks. CFIA also supports the Canadian Animal Health Surveillance System website, which includes the Finfish Health Tracker, used to increase awareness of citizen science projects and lead to improved data capture for wild populations.

Parks Canada uses various approaches, like open houses, public consultations, and online webpages to promote citizen science activities. Parks Canada programs and activities available to citizen scientists are generally promoted through its public website and Parks Canada has a growing outreach impact through its social media platforms, allowing it to share and communicate citizen science opportunities, activities, and results. Finally, Parks Canada recognizes citizen science's potential as an education tool, and organizes many activities to develop and nurture scientific and knowledge gathering skills for citizens of all ages over a broad range of fields. Some examples include archaeological activities where citizens discover history and science by working with professional archaeologists, historians, or biologists, Bioblitz events such as Bioblitz Canada 150, or learning and sharing Indigenous culture through First Nations, Metis and Inuit Culture Camps such as the Mi'kmaw youth archaeology camp in Kejimikujik National Park and National Historic Site. In 2022, there were 108 activities involving citizen scientists, for a total of 31,594 hours of volunteering.

The **Canadian Space Agency (CSA)** uses various approaches to engage the public. For instance, the Space Apps Challenge hackathon, created by NASA and hosted in collaboration with the CSA and twelve other international space agency partners, is one way that the CSA engages citizen scientists on important research topics and open science. Participants are given 48 hours to solve one of a series of challenges using open space data, and their solutions are made widely available in open source. With the 2023 event attracting over 57,000 people, including over 1,300 Canadians, the wealth of software tools produced contribute enormously to the research ecosystem.

The Government acknowledges the value of formalized guidance and infrastructure to support researchers in engaging with the public. This includes the recruitment and retention of citizen science volunteers, as well as facilitating the exchange of data and input. Efforts to advance the development of these resources have progressed with the support of a Health Canada-led federal community of practice on citizen science. This federal community mobilizes 13 departments and agencies in the sharing of best practices to identify and discuss data infrastructure needs, and collaborate on guidance development. In parallel, the Government recognizes the importance of increasing and improving public access to data and information, and reporting on how science-based departments and agencies are implementing open science activities. The Government is currently drafting an Open Government Strategy, which will serve as a strategic and visionary instrument on areas where the Government can continue to advance efforts around transparency, accountability, and participation, which will also support citizens seeking to participate in federal science and research.

Recommendation 4: That the three granting councils, namely the Social Sciences and Humanities Research Council (SSHRC), the Natural Sciences and Engineering Research Council (NSERC), and the Canadian Institutes of Health Research (CIHR), include civic engagement in the criteria for evaluating funding applications.

The Government acknowledges the Committee's recommendation that SSHRC, NSERC and CHIR include civic engagement in the criteria for evaluating funding applications. Currently, each of the granting agencies has practices in place to support civic engagement through various initiatives. More specifically, civic engagement is supported in a subset of programs at SSHRC and CIHR; it is generally supported at NSERC as citizen engagement is reflected in its 2022 Guidelines on the assessment of contributions to research, training, and mentoring.

CIHR

CIHR developed the Strategy for Patient-Oriented Research (SPOR) on the principle of "patient engagement," or involving patients as partners in all aspects of research to ensure research questions and results are relevant. Research and activities funded through SPOR create environments that are conducive to working with patients across Canada, to ensure that patients' priorities are integrated into health research at the outset.

More broadly, citizen engagement is reflected in CIHR's 2021–2031 Strategic Plan to develop and promote a renewed concept of research excellence that values the three principles of equity (fairness), diversity (representation), and

inclusion (valued participation) to support the advancement of research excellence in all its diversity. This approach recognizes patients, the general public, healthcare providers, decision-makers, and other users of research outputs as active collaborators throughout the entire research process.

CIHR also requires persons with lived and living experience (PWLLE) and patient engagement for all funding applications under the SPOR envelope. This requirement is increasingly being applied to other priority-driven CIHR funding opportunities as well as applications to open programs. This approach includes requiring PWLLE/patients as members of the applying research teams with defined roles and responsibilities; requiring PWLLE/patient engagement plans or considerations within research proposals; providing evaluation criteria specific to PWLLE/patient engagement to be assessed by peer reviewers; and engaging PWLLE/patients and individuals with PWLLE/patient engagement expertise as members of peer review committees. CIHR further engages citizens and patients by inviting their participation on committees such as the Institute of Human Development, Child and Youth Health Advisory Council and one Institute Advisory Boards.

SSHRC

SSHRC also has several funding opportunities designed to promote the involvement of citizens and communities in research, and in some cases uses these factors as criteria for funding. In 2021, SSHRC launched the Race, Gender and Diversity Initiative, which supports community-based and community-led research partnerships with postsecondary institutions that are grounded in the lived experience of underrepresented or disadvantaged groups and that analyze the causes and persistence of systemic racism and discrimination.

SSHRC also recently launched the 2023 International Joint Initiative for Research in Climate Change Adaptation and Mitigation. The initiative aims to further the design and implementation of coproduced adaptation and mitigation strategies for vulnerable groups that are most impacted by the effects of climate change, owing to both physical and socioeconomic vulnerability. Funded projects are expected to take a trans-sectoral approach that could involve community sectors in the design and execution of the project to ensure that projects yield useful and timely results.

SSHRC's Partnerships suite also promotes engagement and co-creation in research by facilitating academic and non-academic partnerships. The Partnership Engage Grants provide short-term and timely support for partnered research activities between academia and a partner organization from the public, private or not-for-profit sector to address an organization-specific need, challenge, and/or opportunity.

NSERC

At NSERC, citizen engagement is reflected in its 2022 Guidelines on the assessment of contributions to research, training, and mentoring, based on NSERC's commitment to an evolved definition of research excellence and the implementation of the San Francisco Declaration on Research Assessment (DORA). DORA is a global initiative designed to support the development and promotion of best practices in assessment of scholarly research and improve approaches to research assessment across disciplines.

Citizen science is recognized among the list of valued contributions to research that would be considered in the assessment of excellence of the applicant and/or the capacity to conduct proposed research activities. Further, the 2022 Guidelines point to citizen engagement several times in the list of impact indicators and contributions to training and mentoring. These references include enhancing equitable and inclusive participation in the research ecosystem and accepting and applying research results from stakeholders, including members of the research community, relevant partners, specific communities, or others who may benefit from the research. The guidelines also promote increased public understanding and interest in the natural sciences and engineering, as well as formal or informal mentoring of highly qualified personnel (HQP), other professionals, or community members.

NSERC actively encourages citizen science initiatives and community involvement through several impactful programs. These include the College and Community Social Innovation Fund grants (CCSIF), PromoScience, Collaborative Research and Training Experience (CREATE), and Alliance Society grants. CCSIF serves as a catalyst for community innovation by bridging the expertise and resources of Canada's colleges and polytechnics with the research needs of community organizations. This collaboration welcomes partners from public, private, and not-for-profit sectors. PromoScience, another NSERC initiative, aims to cultivate an appreciation for science and engineering among young Canadians by offering support to organizations engaged in this educational outreach. CREATE supports training and mentoring of highly qualified students and postdoctoral fellows, both from Canada and abroad. It achieves this by developing innovative training programs that foster skills necessary for job readiness. Among other things, the program encourages student mobility across different universities and sectors; and fosters partnerships with community members and organizations. Additionally, Alliance Society grants fund projects with societal impact as the main driver. These grants support research activities that will address societal challenges resulting in new natural sciences and engineering knowledge and societal impact and bring together academic, partner organizations (including not-for-profits and community groups), and societal perspectives and skill sets throughout the collaborative process.

Recommendation 5: That the Government of Canada consider increasing funding to enhance the capacity of organizations conducting citizen science projects.

The Government acknowledges the Committee's recommendation. Canada's federal research ecosystem is both diverse and decentralized. Departments and agencies with substantial intramural and extramural research funding develop policies and make their own decisions for the areas under their mandate. Departments and agencies will continue to fund, and in some cases consider increasing funding, to better support citizen science projects.

As previously mentioned, **ECCC** plays a leadership role in the delivery of many citizen science programs, and provides substantial financial and in-kind support to organizations that deliver or make use of a broad range of citizen science programs, including CoCoRAHS, SmartIce, CABIN, urban air quality monitoring, and numerous programs for migratory birds and other wildlife. Within the realm of wildlife monitoring, the Canadian Wildlife Service (CWS) at ECCC has provided \$9.4 million over the past three years to Birds Canada to support a range of activities that engage citizen scientists, including building fully bilingual data entry platforms and apps for data collection and quality control; coordination, engagement and promotion of citizen science programs; development of a comprehensive bilingual platform with decision support tools (NatureCounts) for public dissemination and sharing of data, and development of programming to incorporate these data into conservation activities. These programs now engage more than 50,000 people every year and collect millions of observations.

ECCC has provided \$1.3 million over the past three years to the Alberta Biodiversity Monitoring Institute to develop and maintain a platform (WildTrax) for managing data collected using acoustic and photographic sensors that can be deployed or analyzed by citizen scientists, including Indigenous collaborators. Similar investments are being made in participatory research with new technologies such as environmental DNA and data platforms for water quality monitoring (e.g., CABIN, DataStream). Recent advances in deep learning and artificial intelligence are being used to enhance the value of the data. ECCC has also contributed \$5.1 million over the past three years to NatureServe Canada and its associated Conservation Data Centres to support, among other activities, extraction and incorporation of data on species of concern from citizen science programs such as iNaturalist into wildlife species status assessments and building platforms, and to help ensure that provincial and territorial data can be made openly available to support conservation decision making.

AAFC supports various citizen science initiatives through a user-centred innovation model. For instance, their Living Labs program applies a collaborative approach where the farmers are at the centre of innovation activities, and their

experiences and knowledge accelerate the development and adoption of sustainable on-farm practices and technologies. Each living lab project brings together farmers, scientists, and other sector collaborators to co-develop, test and evaluate innovative technologies and on-farm beneficial management practices in real working conditions. This approach allows the farmers to work directly with scientists to identify research priorities and goals, design work plans, develop innovative solutions, assess outcomes and apply the results to their farms. The role of the farmer is vital to the innovation activities and also in promoting the knowledge that is created to aid adoption by the wider farming community. The success of the original Living Labs program enabled the establishment of the Agricultural Climate Solutions-Living Labs (ACS-LL) in 2022, a \$185 million 10-year program that has already established a national network of 14 sites whose work focuses on carbon sequestration and emissions reduction.

Jointly administered by **ISED** and **Health Canada**, the Strategic Science Fund (SSF) is the Government of Canada's new approach to improve the effectiveness of federal investments in third-party science and research organizations (TPOs), through a competitive, merit-based and transparent process, and informed by the advice of an independent Expert Panel. As announced on December 6, 2023, the inaugural recipients of this Fund will support the continuation of world-class, cutting-edge research; train the next generation of Canadian scientists; transform research and knowledge into action; and promote the use and benefits of science across society. It is anticipated that several SSF recipients could conduct community-based and Indigenous-led research projects with public appeal or relevance. This could include research-related activities in partnership with scientists, knowledge holders, and the public. The work done by SSF recipients across the country will be critical to improving the health, economic, and social well-being of Canadians now and in the future.

Conclusion

Canada and countries around the world are leveraging citizen science to strengthen their research ecosystems and better understand complex issues. As outlined throughout this Government Response, empowering and enabling citizens to participate in research yields considerable benefits for science as well as society.

The Government of Canada appreciates the Committee's findings on the value and contribution of citizen scientists and supports the recommendations, which are strongly aligned with existing federal policies, programs and investments. The Government ensures citizen science is integrated into federal research programs, enables citizen science projects on public lands and national parks, engages the public on opportunities to participate in citizen science, incorporates

community engagement into tri-council funding programs, and makes other funding mechanisms available for participatory research. Recognizing the opportunity for deeper integration, the Government will continue to support the important role of citizen science in fostering a robust research ecosystem and a more engaged and democratic society.

In closing, the Government appreciates the Committee's efforts to develop and release its Report, entitled *The Role and Contribution of Citizen Scientists*, as well as its ongoing commitment to promoting a vigorous dialogue on strengthening science, research, and innovation in Canada. The Government looks forward to continuing to work with the Committee, the research community, and Canadians to integrate citizen science into Canada's science and research ecosystem. With research increasingly affecting our everyday lives, it is all the more necessary that, where appropriate, we continue to bring citizens into science.

Sincerely,

A handwritten signature in black ink, appearing to read 'F. Champagne', with a stylized flourish at the end.

The Honourable François-Philippe Champagne, P.C., M.P.