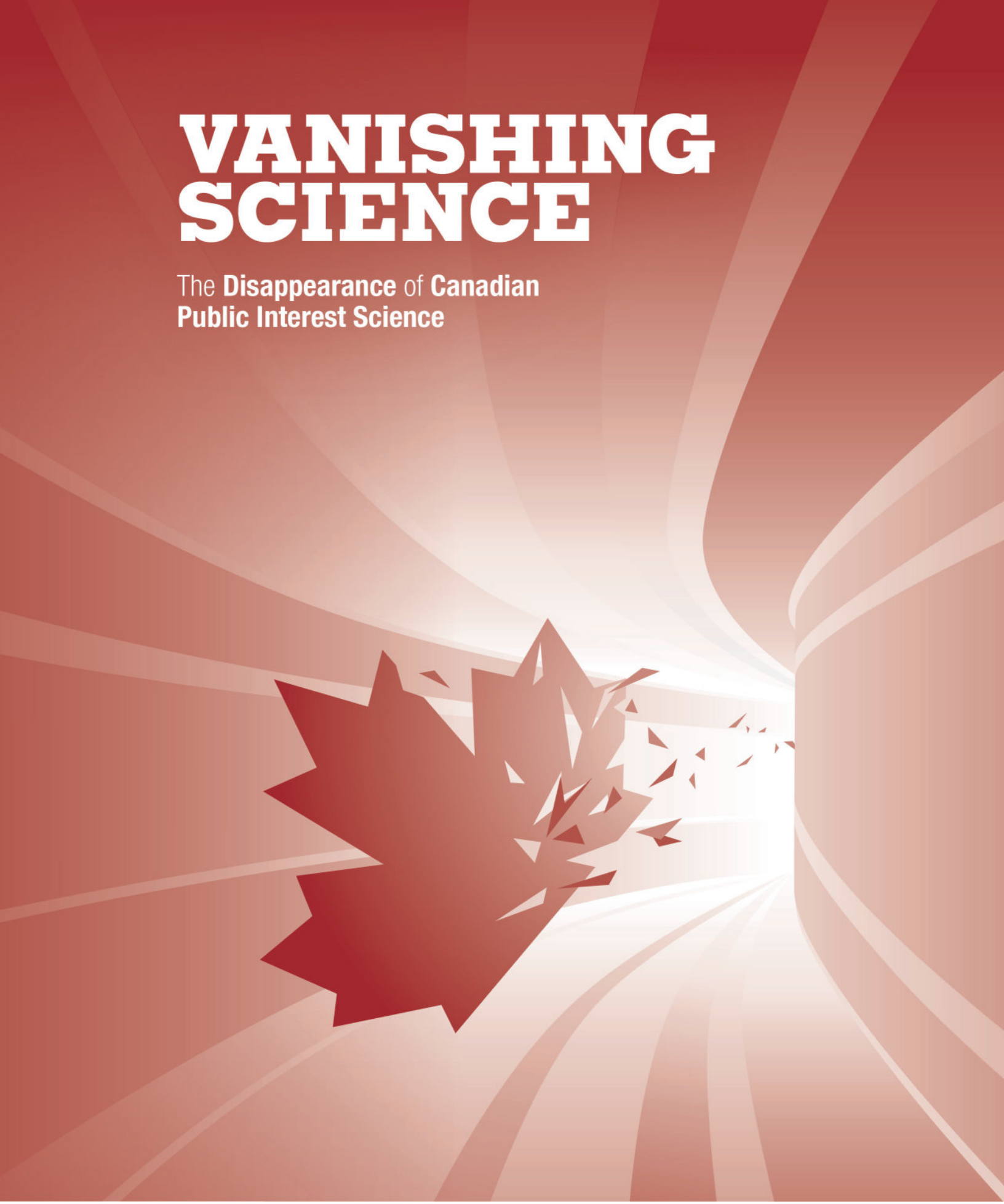
# VANISHING SCIENCE

## The **Disappearance** of **Canadian Public Interest Science**



The Professional Institute
of the Public Service
of Canada

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## Introduction: Cuts, Cuts, Cuts

Over the past five years – particularly, since the global financial crisis demanded a temporary outpouring of public money to boost the economy – the Harper government has made strenuous efforts to reduce costs and, more recently, re-align scientific research at federal science-based departments and agencies (SBDAs). These reductions have been accompanied (at least since the government's massive, cost-cutting budget of 2012) by public assurances that the overwhelming majority of cuts would affect only "back office operations." [1] In other words, the loss of millions of dollars from the science budgets of Agriculture Canada (AAFC), Environment Canada (EC), Fisheries and Oceans (DFO), the National Research Council (NRC), Natural Resources Canada (NRCan), Statistics Canada, and others – to say nothing of the billions of dollars still to be cut – would not be noticed. Nor would the loss of hundreds of jobs or so-called "full-time equivalent" (FTE) positions.

In fact, even after accounting for the extraordinary impact of stimulus spending, between 2008 and 2013, a total of $596 million[2] (in constant 2007 dollars) has been cut from science and technology (S&T) budgets at federal SBDAs, and 2,141 FTEs have been eliminated. Measured in sheer dollar amounts, the cuts have fallen more heavily on some departments than on others: Environment Canada, for example, has seen its science budget cut by $125 million (17.5%); the National Research Council of Canada, $129 million (17.2%); Fisheries and Oceans, $28 million (10.2%). Similarly, some but not all departmental cuts have included the elimination of FTE science positions: e.g., National Research Council of Canada (798 FTEs), Environment Canada (159 FTEs), Fisheries and Oceans (73 FTEs).

But numbers alone do not tell the whole story. Following the now-familiar pattern of Harper government budgets, few or no details have accompanied the announcement of cuts. It has been left to scientists both inside and outside government, unions, the media and concerned Canadians to reveal the details and raise alarms about the effects of these "back office" cuts. Some have resulted in the loss of whole programs, including the Environment Canada-funded National Roundtable on the Environment and the Economy – for 25 years the leading federal advisory panel on sustainable development – the Hazardous Materials Information Review Commission, and the Canadian Foundation for Climate and Atmospheric Sciences, as well as the DFO-funded Ocean Contaminants and Marine Toxicology Program. Other cuts have led to diminished programs with, at best, tenuous funding: e.g. the Polar Environment Atmospheric Research Laboratory (PEARL), the second-northernmost research centre in the world, had only a portion of its five-year funding saved in 2013 (after initially seeing it erased entirely in 2012) to continue monitoring, among other things, the massive hole in the ozone layer above the Arctic discovered by staff in 2011. Environment Canada's and DFO's Species-at-Risk programs have suffered a similar fate.

Other cuts have forced provincial governments to fund at least partly what the federal government has eliminated wholly, such as the world-renowned Environmental Lakes Area (ELA) in Kenora, Ontario – the largest continuous research undertaken of freshwater lakes in the world.

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They cast doubt on the government's commitment to issues such as curbing air pollutants from smokestack emissions, a challenge made more difficult by the disbanding of the Environment Canada team of seven scientists dedicated to measuring air pollution from smoke stacks. They include the loss of storehouses of scientific knowledge and information,

1 "The majority of the spending review reductions relate to back office operations of government," Finance Minister Jim Flaherty quoted in the *Toronto Star,* March 28, 2012.

2 Statistics Canada. Federal Scientific Activities. 2013/2014. Catalogue no.88-204-X

Between 2013 and 2016, **$ 2.6 billion and 5,064 jobs will be cut** from 10 science-based departments alone

including the closure of seven libraries at DFO, six at NRCan and the consolidation of five Parks Canada libraries into one at Environment Canada. They include the loss of leading experts in their fields such as Dr. Michael Arts, an international authority at Environment Canada on the health of aquatic ecosystems. (The elimination of Dr. Arts' position prompted 90 internationally renowned scientists, including members of the Royal Society of Canada, to write letters of protest to the government.) Dr. Kenneth C. Johnson, a senior epidemiologist at the Public Health Agency of Canada (PHAC), was the only remaining scientist at PHAC or Health Canada whose work focussed directly on the study of tobacco and cancer, specifically the connection between second-hand smoke and breast cancer. Dr. Phil Burton, a research scientist and manager of Northern Projects for the Pacific Forestry Centre (PFC) of the Canadian Forest Service, played a vital role in assessing the impact of the Mountain Pine Beetle and, before his departure in 2012, Enbridge's Northern Gateway pipeline proposal.

Jean-Pierre Gagnon was an engineer with the federal government for 32 years – 23 of them spent at Transport Canada – and one of North America's leading experts on train cars carrying dangerous goods, including the DOT-111 rail tank cars at the centre of the Lac-Mégantic tragedy on July 6, 2013. Over a year earlier, in April 2012, he received notice that his position would be affected by workforce adjustment. At the time, he was working on a project reviewing the security and integrity of non-pressurized rail tank cars such as the DOT-111. Shortly before he retired from the public service in March 2013, he had convened a meeting with industry on the safety of the DOT-111 cars.[3]

The cuts have also contributed in their way to Canada's science brain drain. Dr. Kenneth Lee, who before receiving an "affected" notice in May 2012 enjoyed a 30-year career with the Department of Fisheries and Oceans, was director of the Centre for Offshore Oil, Gas and Energy Research and the country's foremost oil spill expert. He spent four months in the Gulf of Mexico providing scientific expertise to efforts at containing the 2010 Gulf oil spill. Today, he directs ocean research at the Commonwealth Scientific and Industrial Research Organisation in Australia.

Many of the cuts have eliminated any hope – at least for the foreseeable future – of policies based on evidence. The loss of Statistics Canada's mandatory long-form census in 2010 and the Health Canada-funded First Nations Statistical Institute in 2012 (the only comprehensive attempt to assess data on educational, social housing and labour force needs among First Nations communities) are just two examples.

3 Lac-Mégantic « Ça y est, c'est arrivé... » *La Presse*, July 20, 2013

But the worst is yet to come. Between 2013 and 2016, a combined $2.6 billion will be cut from 10 federal science-based departments and agencies alone (Agriculture Canada, the Canadian Food Inspection Agency, the Canadian Space Agency, Environment Canada, Fisheries and Oceans Canada, Health Canada, Industry Canada, the National Research Council, Natural Resources Canada, and the Public Health Agency of Canada), including a projected 5,064 FTE positions.[4] Over the next year, $355 million[5] will be cut from all S&T budgets – more than half the total cut over the previous five years.

The government's credibility, already in tatters after numerous financial fiascos ranging from the true costs of purchasing new F-35 fighter jets to the false expense claims of the Duffy-Wright Senate scandal, has frayed to the point that its assurance such cuts will be neither seen nor felt hangs on the slenderest of threads.

So what kind of impact will ongoing cuts to federal science have? What science will be lost and realigned? How will the losses in dollars and FTEs affect Canada's obligations in the future? Since the Harper government's election platform did not feature dramatic cuts to federal science, are Canadians even aware of the likely impact of these cuts? Do scientists support them? Do Canadians?

Given its penchant for secrecy and control, the Harper government has proven an unreliable source of information. But a survey of federal government scientists conducted last spring provides some valuable answers to these questions, as does a more recent public opinion survey of Canadians' views.

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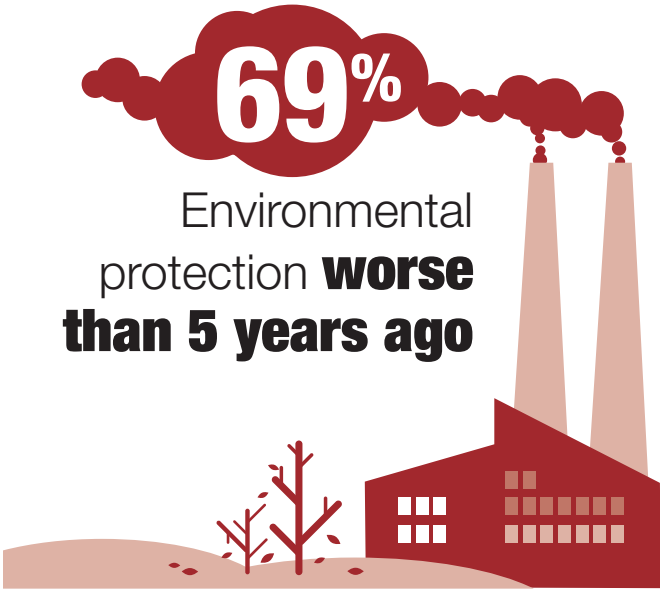


In the spring of 2013, the Professional Institute of the Public Service of Canada (PIPSC), the largest union representing scientists and other professionals in Canada, commissioned Environics Research Group to examine these and other questions of concern to federal scientists and the Canadian public. PIPSC represents scientists in 40 federal departments and agencies. It therefore has unique access to many of those who ensure the health and safety of Canadians, the protection of our environment and the vitality of our economy. Between June 5 and 19, 2013, invitations to participate in an online survey were sent to 15,398 of these members, of which 4,069 participated. The results of the survey are considered accurate + or - 1.6%, 19 times out of 20. (The margin of error is slightly larger for questions asked only of sub-samples.)[6]

In addition, a similar but shorter public opinion survey was conducted by Environics of 1,003 Canadians between November 14 and 20, 2013. The results of this survey are considered accurate + or – 3.1%, 19 times out of 20.

## Measuring the Impact, or How Bad Is It?

According to the survey of PIPSC members, 9 out of 10 federal scientists (91%) say recent science cuts are having or will have a detrimental impact on the government's ability to serve the public interest, including over half (51%)

4 Reports on Plans and Priorities. http://www.tbs-sct.gc.ca/rpp/index-eng.asp
5 Statistics Canada. Federal Scientific Activities. 2013/2014. Catalogue no.88-204-X
6 This is the second of two reports prepared by PIPSC based on data from the survey. An earlier report on the impact of political interference and muzzling on federal scientists, *The Big Chill*, was released in October 2013.

who consider the impact to be very detrimental. They are not alone. When told that the government will cut science spending by $355 million over the next year alone, a large majority of Canadians (69%) say the cuts will have a negative impact on the federal government's ability to serve the interests of Canadians, including 3 out of 10 (32%) who think the impact will be very negative. Even among Conservative supporters, nearly 6 out of 10 (59%) feel that the cuts will have a negative impact.

It is worth noting that most Canadians – and federal scientists – hold this opinion even without knowing the details of either the $355 million in government science cuts to be implemented over the next year or additional cuts scheduled to take effect in subsequent years.

## Lost Capacity, Declining Environmental Protection

Over 9 out of 10 scientists (94%) surveyed feel recent cuts have had a negative impact on overall science capacity in the federal government. Nearly 6 out of 10 (59%) believe the impact is major. In addition, over three-quarters of federal scientists (78%) report cuts to capacity in their own workplace. In the words of one scientist: "In 31 years on the job, never have I witnessed such systematic destruction of the scientific capability of the federal public service." In the words of another: "Science has been cut to the bone; there is no way to reduce further without just stopping."

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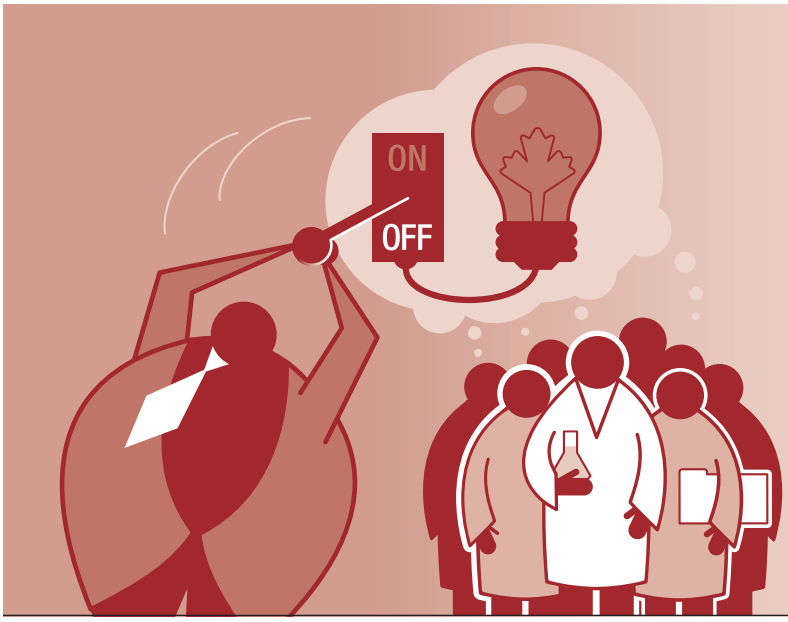
Significantly, nearly 7 out of 10 scientists (69%) at Environment Canada believe Canada is doing a worse job of environmental protection and sustainable resource management than five years ago. Over 8 out of 10 (83%) in the Department of Fisheries and Oceans believe the same. As one respondent commented: "Cuts to staff have severely reduced the quality of service that DFO is able to provide to industry and the public." As another wrote: "The face of DFO is now virtually gone from communities and especially in the North where all the development is occurring. We are becoming a 'Banana Republic' when it comes to environmental legislation and regulations. These wholesale changes are being led by ideology and not cost savings or common sense. The list of threatened and endangered species continues to grow. Salmon stocks are struggling all along the west coast of North America. The number of contaminated sites continues to grow and clean up efforts are tied up in politicized bureaucracy." [7]




**80%**

Of NRC scientists believe Canada has done a **worse job of advancing innovation** over the past 5 years

7 The federal government's inventory lists more than 21,000 sites, including "confirmed contaminated sites, suspected contaminated sites, and about 9,000 'closed' sites where remediation was either completed or not required."

Even at NRCan, where nearly a quarter (24%) of scientists feel the department is doing a better job of supporting the profitability of extractive (i.e., oil, gas, and mining) sectors, over half (53%) feel the department is doing a worse job of ensuring environmental protection and sustainable resource management than five years ago.

## Disappearing Acts

Much of the controversy over government omnibus budget bills centres on their misuse to expedite sweeping changes to existing laws. In addition to announcing billions of dollars in cuts, for example, the 2012 omnibus budget bill introduced no fewer than 77 legislative changes, including massive changes to the *Fisheries Act*, the *Environmental Assessment Act*, and the *Navigable Waters Protection Act*.

According to the survey, 86% of DFO scientists believe changes to the *Fisheries Act* will hamper Canada's ability to protect fish and their habitat. Specifically, 81% believe DFO's ability to protect fish and their habitats will be hampered by the replacement of the Habitat Management Program with the so-called Fisheries Protection Program.

As one scientist wrote: "Arbitrary changes to the *Fisheries Act*, the *Environmental Assessment Act*, the *Navigable Waters Act* and cuts to EC and DFO Habitat [Management Programs] have tilted the playing field towards industrial development to such an extent that environmental/fisheries regulations are practically non-existent or unenforceable for future developments."

*Canada already spends far less than the OECD average on government R&D – 0.16% of GDP vs. 0.28% of GDP respectively – and has shown an increasing bias towards investing in business enterprises to the neglect of government science and R&D.*

**86%** Of scientists believe changes to the Fisheries Act **harm fish and their habitat**

## Underfunding, Changing Priorities

Underfunding of science is another, persistent concern. According to the survey, 7 out of 10 federal scientists (71%) feel their department/agency does not allocate sufficient resources to effectively fulfill its mandate.

Moreover, new budget priorities that aim to encourage greater commercial benefits from science are taking their toll. While internal S&T spending, much of which focuses on protecting public health, safety and the environment, is projected to decrease by $162 million over 2013/2014, external spending on S&T business enterprise is scheduled to increase by a projected $68 million.[8]

Yet the growing abandonment of so-called basic science in favour of greater support for commercial ventures shows no sign of improving Canada's track record when it comes to innovation – at least, according to the scientists most involved in it. At the NRC – the former powerhouse of scientific innovation credited with pioneering everything from the cardiac pacemaker to computer animation – 8 out of 10 scientists (80%) believe Canada has done a worse job of advancing the country's international standing in innovation and technology over the past five years. Nearly 9 out of 10 (87%) believe recent changes are limiting or will limit fundamental or basic research, and nearly as many (86%) believe this will have a negative impact on research and development (R&D) generally. Canada already spends

8 Statistics Canada. Federal Scientific Activities. 2013/2014. Catalogue no.88-204-X

*"Scientists from my department are regularly declined to attend conferences in which they are invited to give keynote lectures, and/or are convening scientific sessions."*

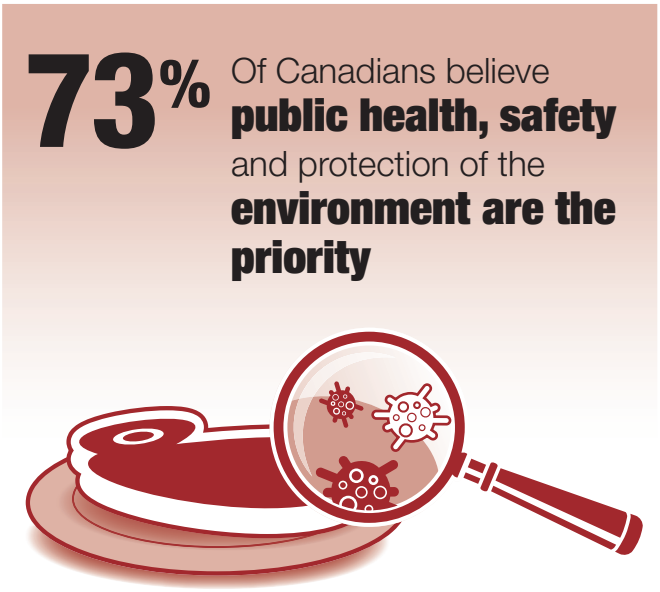
far less than the OECD average on government R&D – 0.16% of GDP vs. 0.28% of GDP respectively – and has shown an increasing bias towards investing in business enterprises to the neglect of government science and R&D.[9]

## Missing in Action

A further blow to Canada's international standing is evident in the dramatic decline in opportunities for professional collaboration and the numbers of federal scientists attending international science conferences. Not only have more restrictive policies compromised the ability of federal scientists to collaborate with international colleagues (73% are concerned that new departmental policies on intellectual property, permission to publish, and collaboration will compromise their ability to collaborate with international colleagues), but cuts to science and so-called red tape have limited scientists' ability to attend conferences, courses and other events directly related to their work. According to the survey, only 36% of scientists are approved to go to such conferences, courses and events, and less than one quarter (24%) of scientists feel that the approval process for conferences, courses and other events is fair, transparent and performed on a timely basis.

In the words of one respondent: "Travel to conferences has been cut to the point where I don't even bother applying. The approval process has become so bogged down with bureaucracy that almost every move has to be approved by the deputy minister. ... It has come to the point where co-workers often pay their own way to conferences in order to network with long-term colleagues, and maintain their professional level on an international scale." In the words of another: "Scientists from my department are regularly declined to attend conferences in which they are invited to give keynote lectures, and/or are convening scientific sessions. This is creating a reputation for Canadian government geoscientists in the international community that it is not worth the trouble to collaborate with us." In the words of a third: "I've been paying my way to conferences for the past three years taking vacation time to do it. I'm not alone in doing this."

As if our national foot-dragging on climate change weren't evidence enough, our increasingly noticeable absence from international conferences now makes it official: Canada is an international science laggard.




## Conclusion: Getting the Balance Wrong

If Canadian public opinion alone is any indication of whether or not the Harper government's science agenda is headed in the right direction, we would have to conclude it is not. Nearly three-quarters of Canadians (73%) believe the top priority for government scientific activity should be the protection of public health, safety and the environment, compared to fewer than one-quarter (24%) who believe the priority should be business innovation and resource development (10%), or both priorities equally (14%).

This suggests that the Harper government has got its science priorities wrong – not only compared to those of Canadians in general, but even to those of Conservative voters and, especially, to those of the broad middle class – since most of the cuts that have already occurred (and many more of those likely to occur) are in areas related to public health, safety and protection of the environment.

9 Organisation for Economic Co-operation and Development (2013), Main Science and Technology Indicators, Vol. 2013/1, OECD Publishing. http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB

*If the past is any indication of the future, the real nature of these cuts will be hidden from public view as long as possible. One thing they cannot be called are cuts to "back office operations" – not unless by "back office" is meant Canada's natural environment, air and water quality, the survival of other species, and of course the health and safety of all Canadians.*

Of those Canadians surveyed who said their voter preference was Conservative, over two-thirds (67%) felt the top science priority should be protecting public health, safety and the environment. And of those surveyed earning between $50,000 and $80,000, over three-quarters (76%) also believed the priority should be protecting public health, safety and the environment.

From this it is fair to conclude that Finance Minister Jim Flaherty's much-anticipated next round of tax cuts and consumer spending initiatives, meant to bolster the Conservatives' base and woo middle-class voters before the next election, will at least partly be paid for by substantial – possibly devastating – science cuts to public health, safety and protection of the environment.

According to the most recent Reports on Plans and Priorities (RPPs), 10 of the key SBDAs[10] face budget cuts averaging 17% over the next few years. As with the previous five years, however, these cuts will fall more heavily on some departments and agencies than on others.

While Agriculture Canada, for example, faces a $574.1-million (20%) budget cut, including the loss of 787 FTEs, DFO faces a further $370.8-million (19.5%) budget cut, including the loss of 848 FTEs. While the National Research Council will see its budget decrease $30.5 million (3.6%) and absorb the loss of 202 FTEs, the Canadian Food Inspection Agency faces a $157.7-million (20.3%) cut and the loss of 1,222 FTEs. Health Canada faces a $653.8-million (17.3%) cut, including the loss of 1,158 FTEs. In addition to these 10 key SBDAs, the Canadian Environmental Assessment Agency will have its budget cut by $15.3 million (47.2%) and lose 81 (one-third) of its FTEs, while Statistics Canada will undergo a $150.6-million (28.8%) cut and the loss 1,221 FTEs.[11]

If the past is any indication of the future, the real nature of these cuts (the people, the programs, the impact) will be hidden from public view as long as possible – or until concerned scientists, Canadians, unions and the media are able through a combination of access-to-information requests and Work Force Adjustment notices to piece together what further reckless cuts to government science will truly cost Canadians in the future. But one thing they cannot be called are cuts to "back office operations" – not unless by "back office" is meant Canada's natural environment, air and water quality, the survival of other species, and of course the health and safety of all Canadians. ■

10 Agriculture and Agri-Food Canada (AAFC), Environment Canada (EC),the Canadian Food Inspection Agency (CFIA), the Canadian Space Agency (CSA), Fisheries and Oceans (DFO), Health Canada (HC), Industry Canada, the National Research Council (NRC), Natural Resources Canada (NRCan), and the Public Health Agency of Canada (PHAC)

11 Reports on Plans and Priorities. http://www.tbs-sct.gc.ca/rpp/index-eng.asp

# Federal Scientists' Survey: Questions and Responses

## Measuring the Impact

As a scientist/engineer working in the federal government, what impact do you think recent government cuts to science capacity are having, or will have, on the federal government's ability to serve the interest of Canadians?

**91% Detrimental impact** (51% Very detrimental, 40% Somewhat detrimental, 8% Slightly detrimental impact, 1% No impact at all)

## Lost Capacity, Declining Environmental Protection

In recent years the federal government has cut funding to many departments and agencies. How much of an impact do you think these cuts have had on overall science capacity in the federal government?

**94% Negative impact** (59% Major impact, 35% Moderate impact, 5% Minor impact, 1% No impact at all)

Have you experienced or seen any reductions or cuts to science capacity in your own workplace?

**78% Yes** (78% yes, 22% No)

Thinking about where Environment Canada was 5 years ago with regard to environmental protection and sustainable resource management, do you think the agency is doing a better or worse job?[1]

**69% Worse** (4% Better, 12% Same, 69% Worse, 15% Unsure/N/A)

Thinking about where Fisheries and Oceans Canada is now compared to five years ago, is the Department doing a better job, worse job, or about the same job on each of the following?[2]

Environmental protection and sustainable resource management

**83% Worse** (3% Better, 8% Same, 83% Worse, 6% Don't know)

Thinking about where Natural Resources Canada is now compared to five years ago, is the Department doing a better job, worse job, or about the same job on each of the following?[3]

Supporting the profitability of extractive sectors

**24% Better vs. 7% Worse** (24% Better, 27% Same, 7% Worse, 42% Don't know)

Environmental protection and sustainable resource management

**7% Better vs. 53% Worse** (7% Better, 22% Same, 53% Worse, 19% Don't know)

## Disappearing Acts

Please indicate to what extent you agree or disagree with each of the following statements…[4]

Fisheries and Oceans Canada's ability to protect fish and their habitats will be hampered by changes to the Fisheries Act.

**86% Agree** (62% Strongly agree, 24% Somewhat agree, 3% Somewhat disagree, 1% Strongly Disagree, 9% Don't know)

Fisheries and Oceans Canada's ability to protect fish and their habitats will be hampered by replacing the Habitat Management Program with the Fisheries Protection Program.

**81% Agree** (57% Strongly agree, 24% Somewhat agree, 4% Somewhat disagree, 1% Strongly disagree, 13% Don't know)

1 Base: Environment Canada scientists (n=670).
2 Base: Fisheries and Oceans Canada scientists (n=343).
3 Base: Natural Resources Canada scientists (n=292).
4 Base: Fisheries and Oceans Canada scientists (n=343).

## Underfunding, Changing Priorities

Please indicate to what extent you agree or disagree with each of the following statements…

My Department/Agency allocates sufficient resources/ scientific personnel for research and development to effectively fulfill its mandate.

**71 % Disagree** (Strongly Agree 3%, Somewhat agree 20%, Somewhat disagree 35%, Strongly Disagree 36%, Don't know 6%)

Scientists working at the **DFO** (90% Disagree), **EC** (81% Disagree), **AAFC** (87% Disagree), and the **CSA** (80% Disagree) are the most likely to feel their department allocates insufficient resources.

Thinking about where the NRC was five years ago with regard to advancing Canada's international standing in innovation and technology, do you think the agency is doing a better or worse job?[5]

**80% Worse** (6% Better, 9% Same, 80% Worse, 5% Don't know)

Please indicate to what extent you agree or disagree with each of the following statements…[6]

Recent changes at the NRC are limiting or will limit fundamental or basic research

**87% Agree** (72% Strongly agree, 15% Somewhat agree, 4% Somewhat disagree, 7% Strongly disagree, 3% N/A)

Reduced capacity for fundamental or basic research will have a negative impact on the NRC's contribution to Canadian R&D and innovation.

**86% Agree** (65% Strongly agree, 21% Somewhat agree, 7% Somewhat disagree, 4% Strongly disagree, 3% N/A)

## Missing in Action

How concerned are you that the new departmental policies on intellectual property, permission to publish, and collaboration will compromise your Department/Agency's scientists' ability to … collaborate with international colleagues?

**Concerned 73%** (36% Very concerned, 37% Somewhat concerned, 20% Not very concerned, 7% Not at all concerned)

I am approved to go to conferences, courses or other events directly related to my duties or that are necessary for professional development and maintaining subject matter expertise.

**Agree 36%** (6% Strongly agree, 30% Somewhat agree, 30% Somewhat disagree, 32% Strongly disagree, 2% DK/NA)

The approval process for conferences, courses or other events is fair, transparent and done on a timely basis.

**Agree 24%** (4% Strongly agree, 19% Somewhat agree, 28% Somewhat disagree, 44% Strongly disagree, 4% DK/ NA)

# Public Opinion Survey: Questions and Responses

## Measuring the Impact

This year it is projected that federal government spending on scientific activities will be cut by $355 million. What impact do you think these cuts to government science will have on the federal government's ability to serve the interest of Canadians?

**69% Somewhat or very negative** (Very positive 5%, Somewhat positive 17%, 37% Somewhat negative, 32% Very negative, No impact at all 5%, DK/NA 4%)

5 Base: National Research Council scientists (n=268).
6 Base: National Research Council scientists (n=268).

*The federal government currently invests in scientific activities that support public health, safety and environmental protection, as well as activities that support business innovation and resource development. What should be the top priority for government scientific activity?*

## Conclusion

The federal government currently invests in scientific activities that support public health, safety and environmental protection, as well as activities that support business innovation and resource development.

What should be the top priority for government scientific activity? Should it be: protection of public health, safety and the environment; business innovation and resource development; both equally; neither; DK/NA?

**73% Protection of public health, safety and the environment** (10% Business innovation and resource development; 14% Both equally; 1% Neither; 1% DK/NA) ■

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