

**A Brief
to the

House of Commons
Standing Committee on Industry, Science and
Technology

by the

Canadian Society for Ecology and Evolution**

INTRODUCTION

The Canadian Society for Ecology and Evolution represents 600 professional scientists and graduate students from all regions of Canada. Our Society's mandate includes facilitating communication between members of the Society and decision-makers in the public, private and non-governmental sectors. We are very interested in promoting the role that ecological and evolutionary science must play in adaptive decisions by Government.

We are pleased that the House of Commons Standing Committee on Industry, Science and Technology have invited briefs on their study into Canadian science and technology. We provide our perspective, and recommendations, on two themes.

**THEME ONE - FEDERALLY FUNDED RESEARCH PERFORMED
IN GOVERNMENT AND HIGHER EDUCATION**

PERSPECTIVE:

Canadian scientists are ~~posed~~ and eager to meet the challenges of Canada's Science and Technology Strategy. Canadian environmental scientists, in particular, are actively promoting excellence in each of the four strategic sectors, and especially so in environmental science and natural resources.

Canadian ecologists discovered that acid rain was altering the chemistry and biology of lakes and terrestrial ecosystems, then formulated successful strategies for recovery and remediation. Likewise, Canadian ecologists were among the first to document climate change, and to position Canada's scientists at the forefront of those seeking solutions.

Canadians were also the first to document the global decline in marine fisheries and to propose new international guidelines to save world fisheries. Other Canadian scientists conceived DNA barcodes and are now leading international efforts to catalogue all species sharing our planet.

But the contributions of Canada's environmental scientists are compromised by insufficient funding to meet the challenges of today, and to achieve the solutions needed in future. In academia, there is a serious mismatch between the need for research funds and the ability of the Natural Sciences and Engineering Research Council of Canada (NSERC), and its partners, to provide them.

The problem of under-funding is especially acute in key strategic areas of environmental research where most of the financial support is provided through the NSERC Discovery Grants Program. When corrected for inflation, and the five-year duration of NSERC Discovery grants, many groups of Canadian scientists are experiencing a reduction in grant spending power of approximately 20%. In the grant-selection committees most relevant to members of the Canadian Society for Ecology and Evolution (Evolution and Ecology, GSC18; Environmental and Earth Sciences, GSC 09), this corresponds to a 1.5 million dollar annual shortfall in research funding.

NSERC's in-depth analysis of its programs and revenue highlight the funding crisis (http://www.nserc.gc.ca/about/2006-2007-figures_e.pdf; accessed 14 January 2008). In terms of constant dollars, the average Discovery Grant awarded by NSERC has declined consistently since 1999 (Table 15) while the cost of research has grown for each of the past 6 years (Table 36). The number of new scientists entering our universities and applying for research funds from NSERC has remained constant over the past four years while the number of awards has declined (Table 37). Canada's gross expenditures on research and development have declined consistently since 2001 (Table 57) and most especially so in natural sciences and engineering (Table 59). Perhaps most revealing of all, Canada's funding for research and development lags behind that of many competing nations at slightly less than 2% of GDP (Table 84). Canada's record is much poorer when funding is considered on a per capita basis. But for the same comparison group, Canada's universities contribute far more to the Nation's research and development effort than any other country (Table 89). This means that under-funding of University scientists depresses research and development in Canada more than it does in other nations.

Under-funding ~~is exasperated~~ by increased demand on NSERC from government scientists with adjunct appointments, and with government's plans to move more strategic research to Canada's universities.

RECOMMENDATION ONE:

Reinvest in NSERC Discovery and Government Science

Discovery grants are renewed on a five-year rotation. So any attempt to correct funding imbalance must receive a consistent and committed increase in funding by the Government of Canada over the next five years. If Canada is to maintain its position as a world leader in science and technology, and reap the long-term benefits accrued through a knowledge-based economy, the Government of Canada must increase funding to the Discovery Grants Program. Government must also increase funding to government research scientists to reduce the total demand on the Discovery Grants Program.

An appropriate and realistic increase in total Discovery Grant funding over five years of \$15 million annually (4.7% of the 2007-2008 Discovery Grant budget), targeted exclusively to that program, would help to redress many of the serious funding shortfalls in Canada's university research laboratories. A five-year program of this modest annual increase would allow research funding for Discovery in Canada to approximate year 2000 funding levels. An equivalent percentage increase should be allocated across all relevant Departments to support the direct research costs of government scientists.

THEME TWO - SCIENCE ADVICE TO GOVERNMENT

PERSPECTIVE:

The Canadian Society for Ecology and Evolution shares the concern of many scientists that the Government of Canada lacks an effective mechanism to receive the best scientific advice to guide government decision making. Although the Science, Technology, and Innovation Council represents a step in the right direction, its composition under-represents the diversity of Canadian and global science, and its reporting structure to the Minister of Industry fails to recognize that all government departments can gain from the best available science.

It is certainly appropriate for the Minister of Industry to seek advice on technology and innovation from a wide range of specialists in government, academia, and industry. The Science, Technology, and Innovation Council is well structured to provide this service.

Scientific advice, on the other hand, exceeds the utilitarian needs of current governments and Canadians. Science can inform government about ground-breaking ideas that revolutionize society, identify promising avenues for investment, provide early warning of future crises, and provide the solutions that Canadians need. This advice can only be garnered from an assembly of the best and brightest of Canada's scientific research community.

RECOMMENDATION TWO:

Create a National Scientific Advisory Council

The Government of Canada should establish a 15-person National Scientific Advisory Council, selected for the breadth and depth of their scientific knowledge, with a mandate to provide Cabinet, individual Ministers, and government organizations with the best scientific advice possible. Membership on the Council would be coordinated through nominations received by the Academy of Science of the Royal Society of Canada. The activities of the Council would include:

1. Providing government with sound scientific solutions to problems of national and international importance.
2. Advising government on scientific priorities and the proper and efficient allocation of scientific research funding.
3. Identifying key scientists to advise government and inform policy.
4. Interpreting the best science for decision makers so that they can devise the most effective and informed policy.
5. Commissioning white papers and reports on crucial issues central to government policy and strategic priorities.
6. Interfacing with Canada's research, government, and industrial scientists to secure the best scientific advice possible.

We believe that such a Council will receive wide support from Canada's science community, and provide government with the quality and diversity of scientific expertise and perspectives to best inform policy and decision making.

CONCLUSION

Hundreds of Canadian ecologists and evolutionary biologists, and their students, are working hard to advance knowledge on such vital issues as conservation of the world's declining biodiversity, finding practical solutions to global warming, preventing infectious and emerging diseases, and controlling invasive species. Many others play pivotal roles in understanding human effects on biological systems, exerting a scientific presence in Canada's Arctic, gaining knowledge about the evolution, genomics, and dynamics of populations, and educating future Canadian scientists to maintain Canada's knowledge and people advantage.

But scientific progress, and our Nation's ability to use scientific knowledge, are stymied by under-funding and an ineffective pipeline to communicate the best science to decision makers. The Canadian Society for Ecology and Evolution recommends:

- **One - Reinvest in NSERC Discovery and Government Science**
with a 4.7% annual increase over five years.
- **Two - Create a National Scientific Advisory Council**
composed of 15 of Canada's leading scientists.

Respectfully submitted,

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