

# EARTH SCIENTISTS MORE RELEVANT THAN EVER to oil and gas industry

by Susan R. Eaton

During the fall of 2008, the Canadian Federation of Earth Sciences (the “CFES”) issued a report entitled *Human Resources Needs in Earth Sciences in Canada*. Dubbed Canada’s ‘first-ever’ multi-sector survey – spanning government agencies, academic institutions, and the petroleum, mining, environmental, and geotechnical industries – the report voiced concerns about declining student enrolments, juxtaposed against a greying population of geoscientists across the board, with the exception of the environmental industry, Canada’s fastest growing employment sector. According to the report, the impending demographic crunch and the projected shortage of highly qualified professionals (HQPs) could threaten the future viability of Canada’s earth science sectors.

With a population of about 20,000 earth scientists nationwide, Canada has a history steeped in mining and oil and gas exploration – the very health of Canada’s Gross Domestic Product (GDP) hinges upon the sustainable harvesting of the country’s natural resources.

The recent global economic turmoil, coupled with a 70% decline in world oil prices, however, has forced the oil and gas sector to slash capital expenditures and to reduce workforces.



Geologists examining the Salten Formation near Canmore, Alberta. Photo Credit: Dr. Elisabeth Kosters, Executive Director, CFES.

## While there was no “one-size-fits-all” solution – each sector faces its own unique challenges – the CFES provided the following action plan:

- 1) General public awareness of the role of earth sciences in society;
- 2) Canada has abundant natural resources and needs scientifically informed extraction and environmental practices;
- 3) Canada’s future challenges include energy, water, material needs, and the management of short-term and long-term hazards;
- 4) Influence education curricula at the provincial level and increase efforts to recruit students into earth science curricula;
- 5) Increase Canada’s annual output of B.Sc. graduates in earth sciences;
- 6) Push to increase employment opportunities for immigrant professionals in the earth science sectors;
- 7) Provide mentors and experienced scientific leadership to younger staff; and
- 8) Advocate for increased research funding for all sectors of earth science disciplines.

A scant six months ago, Calgary-based oil and gas companies were aggressively competing for both entry level and experienced earth scientists – today, layoffs in the oil and gas sector have translated into an uncertain future for geoscientists. Despite being published during the euphoria of an unprecedented economic boom, the CFES survey provides an historical overview of employment trends, and lays out a road map to bridge the growing capacity gap, addressing human resource needs during the next five years.

According to Canada’s oil and gas industry leaders, the report’s findings are timely – and more relevant than ever – as the industry weathers the current economic storm, navigates uncertain waters, and shifts its business model from exploring for conventional to unconventional resources in the Western Canada Sedimentary Basin.

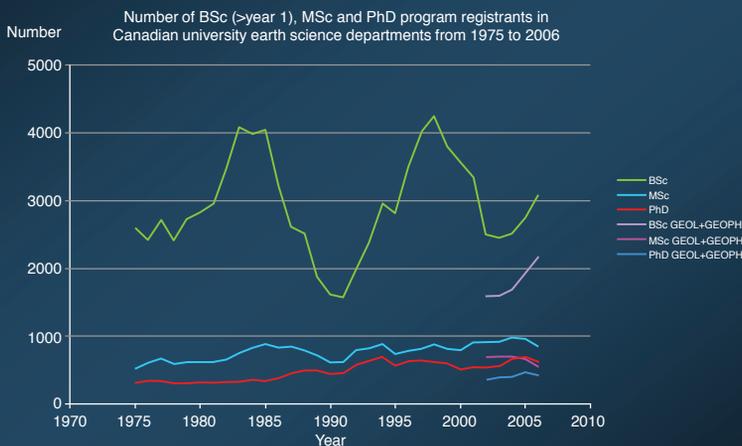
“No one has ever looked at purely earth sciences across the industrial sectors, at demographics and future trends,” says Ian Young, past president of the CFES and EnCana Corporation’s Vice President, Business Affairs Canadian Foothills. “To

me, the results of the survey are even more urgent because we’re experiencing a recession.”

Data collected by the CFES indicate that university enrolment, at the B.Sc. entry level, tracks the boom and bust cycles of commodity prices for metals and oil. Between 1986 and 1999 – tumultuous years for the global oil and gas industry – academic enrolment plummeted in undergraduate Earth Science programs. During this same time period, Canada’s oil and gas industry experienced waves of layoffs and dramatically reduced the recruitment of university graduates, resulting in today’s bimodal distribution of new hires and baby boomers. “When the demand side (for oil) picks up again, we’re going to have a worse human resources problem,” cautions Young. “People have described mining and oil and gas as the two solitudes,” he said, pointing to Canada’s traditional employers of Earth scientists. “Hopefully, there’s more work for geoscientists in geotechnical, environmental, and mapping applications.”

Dr. David Eaton, professor of geophysics and head of the Department of Geoscience

## Academic

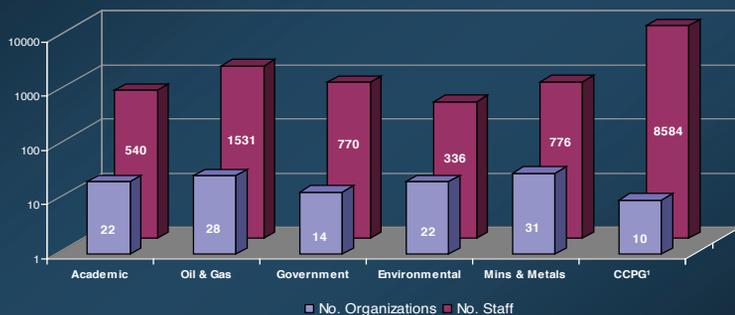


Source: CCCESD



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## Number of Responding Organizations and Geo-science Staff/Members



\*CCPG members reflect a total registered population. As some members register more than once, the total count may be overstated.



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at the University of Calgary, echoes Young's comments. "We need to think outside the box. Geology and geophysics students receive unique, hands-on exposure to important real-world problems, preparing them for many careers paths – from law to education – in addition to traditional professional employment in the oil industry." The University of Calgary's Geoscience Department has established four main areas of technical expertise: exploration geophysics, petroleum and energy-related geoscience, environmental geoscience, and solid Earth processes.

"The current generation of students across Canada is environmentally savvy. We need to demonstrate to them the fundamental role

of environmental geoscience," says Eaton, suggesting, at the same time, that the oil and gas sector needs to dispel some public misperceptions about its environmental track record.

According to the CFES report, the environmental sector's need for earth scientists is expected to grow by more than 30% during the next five years alone – exhibiting a dynamic all of its own, this sector is attracting an ever-increasing percentage of Canada's young geoscientists.

With a compliment of 480 undergraduate and 170 graduate students, the University of Calgary is, by far, Canada's largest Earth Science degree-granting institution – in

fact, according to Eaton, his department represents approximately 15% of Canada's entire undergraduate geoscience population. At a time when most other Canadian universities are experiencing falling Earth Science enrolments, the University of Calgary – located at the epicenter of Canada's oil patch – is recruiting new faculty members in response to increased student numbers and generous industry funding, including EnCana's recent endowment of a Chair in Unconventional Gas Research.

"The Canadian oil patch is unique globally, in that it prefers Bachelor graduates for entry level hires, and molds them into the corporate culture," explains Eaton. "It reflects a tradition here." He suggests, however, that the current economic downturn may produce a greater demand for M.Sc. graduates who possess broader levels of expertise. "Exploration and production activities are getting more challenging," explains Eaton, citing a growing focus on unconventional resources in Western Canada, a recently announced \$100-million mapping program of the Canadian Arctic by the Geological Survey of Canada, and advancements in carbon capture and geological sequestration.

"As we move forward from conventional to unconventional resources, there are different skills required," says Young about the changing face of oil and gas exploration in Canada. "We're moving from 'romantic' pioneering exploration teams working in undeveloped basins, to a new reality where earth scientists are part of multi-disciplinary teams trying to extract the most from the rocks."

According to the CFES findings, education requirements vary by sector, with the environmental and mining sectors employing a far larger percentage of M.Sc. graduates than the oil and gas sector. Not surprisingly, government and research agencies mainly hire earth scientists with M.Sc. and Ph.D. degrees.

### ABOUT THE CFES

The CFES or FCST (the "Fédération canadienne des sciences de la Terre") is an umbrella organization comprised of 12 technical and learned societies and interest groups, including the Canadian Society of Petroleum Geologists (the "CSPG"). Striving to be the unified voice for earth sciences in Canada, the CFES engages the general public, producing outreach, education, and career materials on earth sciences for K-12

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school children and university students. Additionally, the organization advocates the use of sound scientific data to shape industry and government policies on resource extraction, the management of the natural environment, and the mitigation of natural disasters.

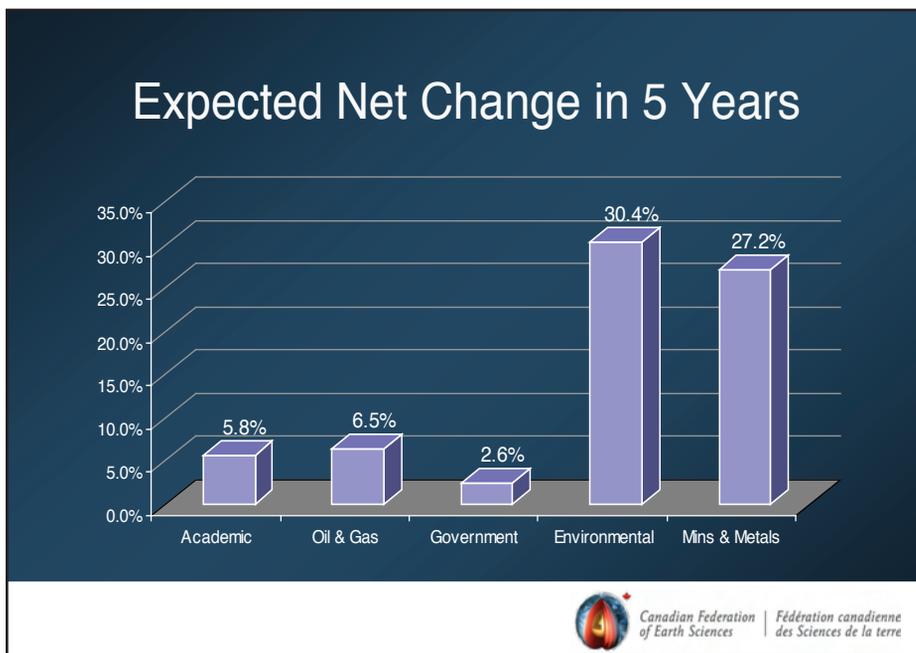
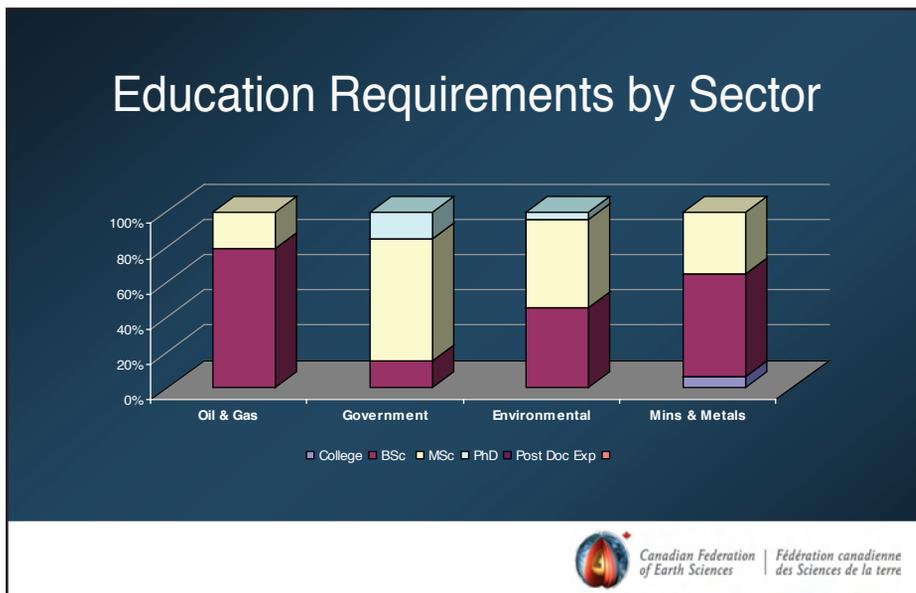
During its human resources study, the CFES polled 20% of Canada's earth scientists, or roughly 4,000 individuals representing more than 117 organizations. Additionally, the CFES survey integrated data from 8,600 geoscientists represented by the Canadian Council of Professional Geologists (the "CCPG"). The CFES report can be viewed at: [http://www.geoscience.ca/CFES\\_HR\\_requirements\\_Canadian\\_earth\\_sciences.pdf](http://www.geoscience.ca/CFES_HR_requirements_Canadian_earth_sciences.pdf).

"I like the CFES report," says Dr. Dale Leckie, chief geologist at Nexen Inc. "It's timely, appropriate, and it agrees with the research I've been doing during the past couple of months." Adds Leckie, "The data speak in the report." As Nexen's chief geologist, Leckie's job includes the recruitment of new graduates and the establishment of formalized, in-house mentoring and training programs for new hires or those individuals with zero to five years of industry experience.

Leckie, also president of the Society for Sedimentary Geology (the "SEPM"), an international technical organization, points to a shortage of young trained specialists in the oil and gas industry, a group that the CFES describes as the HQPs. "If we discourage the new graduates, we will be facing the same shortage when the industry picks up again. And, it's not just layoffs – it's also the lack of hiring." At writing, Leckie indicated that Nexen was honouring job offers to this year's crop of university graduates, while continuing to invest in the training of its new hires.

### DEMOGRAPHIC CRUNCH

"The CSPG saw this demographic crunch coming in the mid-1980s," says Graeme Bloy, president of the CSPG and Vice President of Exploration for Canada Capital Energy Corporation. As a technical society, he says, the CSPG has a bimodal membership distribution skewed towards the baby boomers, a group commonly referred to as the grey bulge. The health of the CSPG, he says, depends upon young geologists entering the industry. In response to membership demographics, the CSPG has allocated a "significant" budget for education and outreach, targeting both university and K-12 students. "At least 50% of earth science



graduates don't even make it into their chosen field," says Bloy who describes the CFES report as a good planning tool.

Bloy was surprised that the CFES report did not address gender issues, indicating that more than 50% of Canada's earth science students are female. "In the oil and gas industry, we've seen such a large increase in women working in the geosciences."

"The industry," explains Bloy, a 30-plus-year industry veteran, "has not historically had a long-term view of manpower management. We have some challenging times ahead, in terms of keeping the younger people in the business." In the event of layoffs, he fears that young geologists will leave the oil and gas industry, as has been evidenced during past economic downturns.

Bloy challenges the oil and gas sector – both large and small companies alike – to do a better job at hiring, mentoring, and training junior geologists. "This crash," he adds, "will severely impact succession planning in companies."

Dr. Grant Wach is Professor of Petroleum Geoscience and Director of Energy at Dalhousie University in Halifax, Nova Scotia. Wach entered academia, after an oil and gas career which began in Alberta's oil sands, and which continued in the research and exploration groups of two major oil companies in Houston. "My job is to begin to train the students, and to interest them in the opportunities in the petroleum industry. It's the responsibility of the petroleum companies to promote careers in their companies, and, for the

most part, they are failing to do so.”

“The petroleum industry needs to make work more exciting,” says Wach. “Right now, the jobs look like the civil service – here’s your workstation and in 25 years, you’re out.” Adds Wach, “Frankly, the Kingston Penitentiary looks more attractive.”

According to Wach, many young geoscience graduates are enthused about the outdoor field work component of their profession – accordingly, they’re choosing to enter the mining and environmental sectors, and are bypassing the oil and gas industry altogether.

Recent earth science graduates are seeking companies who engage them by providing mentorship, training, career development, interesting and varied projects, competitive salaries, and flexible employment options. Adding to this already expansive shopping list, some of these Generation “Y” candidates are choosing employers who mirror their personal values on issues ranging from the environment, sustainability, human rights, community giving, and volunteer involvement.

Paul Bauman, manager of the geophysics division at WorleyParsons Komex, a Calgary-based environmental consulting firm which competes against oil companies to recruit geoscientists and engineers, believes that the youth of today are distinctly different. “Today’s graduates are leisure conscious – they want the best of both worlds. It’s a whole different work ethic.” Bauman suggests, as well, that young recruits also crave value-added mentorship in the workplace: “They want to flourish and they want to be nourished.”

Kelly Murphy is a human resources business partner, specializing in exploration teams at Devon Canada Corporation. “From a demographic perspective, the CFES report rings true, for us at Devon and globally,” says Murphy. “We see that hiring gap in the Generation “X” group, the 33- to 43-year-old geoscience professionals.” Adds Murphy, “The demographic challenges to Devon are not unique, but are common to the industry.” Devon describes the baby boomer generation as “the blue wedge,” a group who is slated to retire soon.

“Engagement is not a snapshot or an event – it’s not a one-time occurrence – and we need to recognize what makes employees stay or go,” explains Murphy, with respect to offering new hires training, mentoring, career rotations, and succession planning.

## BABY BOOMERS FEELING IMPACTS OF FINANCIAL DOWNTURN

The current economic downturn may provide a small silver lining for the oil and gas industry: experienced oil and gas geoscientists, the baby boomer generation, are re-evaluating the financial implications of retiring within the next five to ten years, and are delaying their inevitable mass exodus – the big “crew change” – from the sector.

“This downturn will keep people working longer, and it will alleviate the corporate drainage of technical knowledge,” says Leckie. “I think the pending grey bulge will be pushed out, and we’re seeing this in all technical disciplines.”

Murphy concurs: “We haven’t lost sight of the blue wedge – it was on our radar screen a year ago. The downturn gives us a bit of breathing room; it also gives us an opportunity to use the baby boomers as mentors to the Generation “Y” group, passing on their skills.”

“Recruiters know what’s coming,” said Catherine Brownlee, president of Prominent Personnel Ltd., a Calgary-based global oil and gas search firm. “The layoffs haven’t even started.” Co-author of the best-selling book, *Want to work in oil and gas?*, Brownlee has been flooded by résumés and has seen a significant number of retired geoscientists returning to the industry, casualties of the global economic downturn. “They’re willing to apply for positions advertising 10 years

of experience, consult full-time or part-time, anything,” she added. “I’ve never seen anything like it: we have become a house of support for people who are desolate.”

In response to the changing economy, Brownlee’s firm has diversified its business model, gearing up for outplacement and career services. Recently, Prominent Personnel has also focused on creating training and mentoring programs for immigrant professionals, a group the CFES targeted to fill Canada’s growing capacity gap for earth scientists. “I see this downturn as a perfect time for foreign professionals to prepare for the future,” said Brownlee. “They can sharpen their skills to get ready for the turnaround.” It’s also a great time,” she added, “for new geoscience graduates who are passionate about the oil and gas industry, to offer their skills (perhaps for a reduced fee) to the industry.”

## BIOGRAPHY

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*Dalhousie University Petroleum Geology students analyzing tidal sediments in Minas Basin, Nova Scotia, as part of their annual field school. Photo credit: Dr. Elisabeth Kosters, Executive Director, CFES.*