



University Graduation and Enrolment for Environment-related Programs

1999-2005



ECO CANADA

Environmental Careers Organization
L'Organisation pour les carrières en environnement

ECO CANADA

ECO Canada (Environmental Careers Organization) develops programs that help individuals build meaningful environmental careers, provides employers with resources to find and keep the best environmental practitioners, and informs educators and governments of employment trends to ensure the ongoing prosperity of this growing sector.



ELM RESEARCH

ELM (Environmental Labour Market) Research investigates current environmental skill and labour trends within the environmental profession and provides up-to-date, timely, and relevant insights that can be applied in policy, business, and educational contexts.

The complete collection of ELM reports is available at www.eco.ca.



ECO CANADA

Environmental Careers Organization
L'Organisation pour les carrières en environnement

ENVIRONMENTAL LABOUR MARKET (ELM)
RESEARCH

University Graduation and Enrolment
for Environment-related Programs

1999-2005

ECO Canada

Canada

This project is funded by the Government of
Canada's Sector Council Program



Copyright © 2008 ECO Canada

All rights reserved. The use of any part of this publication, whether it is reproduced, stored in a retrieval system, or transmitted in any form or means (including electronic, mechanical, photographic, photocopying or recording), without the prior written permission of ECO Canada is an infringement of copyright law.

ECO Canada (2008). *University Graduation and Enrolment for Environment-related Programs 1999-2005*. Environmental Labour Market (ELM) Research. Environmental Careers Organization Canada.

ISBN 978-1-897565-05-6

ECO CANADA

Suite 200 - 308, 11th Avenue SE
Calgary, Alberta T2G 0Y2

Tel.: (403) 233-0748 or 1-800-890-1924

Fax: (403) 269-9544

info@eco.ca

www.eco.ca

TABLE OF CONTENTS

SECTION 1: INTRODUCTION	01
SECTION 2: METHODOLOGY AND DEFINITIONS	01
SECTION 3: RESULTS	04
3.1 University Enrolment in Environment-related Programs growing at a slower Pace than Overall University Enrolment	04
3.2 University Graduation in Environment-related Programs Decreasing	06
SECTION 4: CONCLUSION	08
APPENDIX A: UNIVERSITY ENROLMENT AND GRADUATION DATA, 1999–2005	09
APPENDIX B: FIELDS OF STUDY OF ENVIRONMENTAL PRACTITIONERS	11



SECTION 1: INTRODUCTION

Employment in the environmental sector is expected to grow by 8.1% between 2006 and 2011. By 2011, there will be an estimated 573,000 individuals working in environmental positions.¹ An understanding of the potential supply of labour that will result from this growth will help employers better plan their human resources in the coming years.

Graduates of post-secondary institutions are an important potential source of employees for the burgeoning environmental sector. This report looks at the graduation trends for 20 university programs related to the sector. The data used for this study is from Statistics Canada's Postsecondary Student Information System (PSIS).

This study is part of a broader research project pertaining to ECO Canada's Environmental Labour Market (ELM) research. ELM research is aimed at improving our understanding of the demand for and supply of human resources in the environmental sector in Canada.

SECTION 2: METHODOLOGY AND DEFINITIONS

The analysis of enrolment and graduation at Canadian universities was done entirely using the Postsecondary Student Information System (PSIS), a national survey conducted annually by the Centre for Education Statistics (CES) at Statistics Canada. PSIS data is collected from public universities and colleges. The database contains graduation and enrolment statistics for all programs included in the Classification of Instructional Programs (CIP) Index.

Key terms used by the PSIS are defined below.²

Enrolment

"Counts of the number of enrolments within each program offered. Each student enrolled within each program is counted. If a student is enrolled in two programs, then this is counted as two program enrolments."

Graduate

"Counts of the number of graduates within each program offered at an institution. Each student that has graduated from each program is counted. If a student has graduated in two programs, then this is counted as two graduates."

¹ ECO Canada. (2007). *Labour Market Transition: A Remedy for Labour Shortages in the Environment*, Environmental Labour Market (ELM) Research.

² Statistics Canada. (no date). PSIS Data Dictionary. <http://www.statcan.ca/english/sdds/5017.htm>

Environment-related Programs

ECO Canada identified 20 educational programs from which environmental practitioners had most commonly graduated based on the Study of Environmental Practitioners 2005-2006. Over 60% of all respondents had a background in one of the programs listed in Table 1 (see Appendix B).

The CIP is subdivided into three levels. For the purpose of this study, the second level was used. The second level, also known as the "subseries," comprises 385 four-digit classes. The subseries represent an intermediate grouping of programs that have comparable content and objectives. In this study, 27 subseries were identified to be linked to environmental employment (see Appendix B).

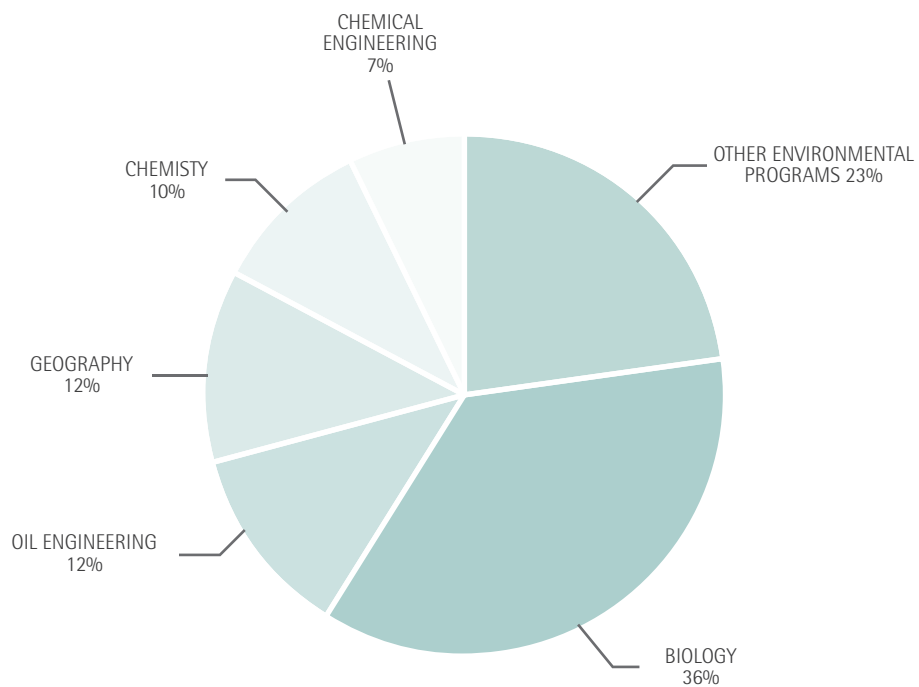
TABLE 1
Environmental programs

PROGRAM	PSIS CODE EQUIVALENT
Agriculture	Agriculture, General (01.0000)
Biology, Aquatic	Aquatic Biology/Limnology (26.1304)
Biology	Biology/Biological Sciences, General(26.0101)
Biology, Conservation	Conservation Biology (26.1307)
Chemistry	Chemistry (40.0501)
Ecology	Ecology (26.1301)
Engineering, Chemical	Chemical Engineering (14.0701)
Engineering, Civil	Civil Engineering (14.0801)
Engineering, Environmental	Environmental/Environmental Health Engineering (14.1401)
Engineering, Geological	Geological/Geophysical Engineering (14.3901)
Environmental Science	Environmental Science (03.0104)
Environmental Studies	Environmental Studies (03.0103)
Forestry	Forestry, General (03.0501)
Geography	Geography (45.0701)
Geology/Earth Sciences	Geology and Earth Sciences (40.0601)
Natural Resource Management	Natural Resource Management and Policy (03.0201)
Science Education*	Science Teacher/General Science Teacher (13.1316), Biology Teacher Education (13.1322), Chemistry Teacher Education (13.1323), Physics Teacher Education (13.1329), Geography Teacher Education (13.1332)
Soil Science	Soil Sciences and Agronomy, General (01.1201)
Urban and Regional Planning	City/Urban, Community and Regional Planning (04.0301)
Water Resources	Water, Wetlands, and Marine Resources Management (03.0205)

*The Science Education category is a combination of five specific science education subject areas: General Science, Biology, Chemistry, Physics, and Geography.

Based on 2005 enrolment numbers, Biology represented the environment-related program with the largest enrolment, accounting for 36% of all students enrolled among the 20 environment-related programs. Civil Engineering (12%), Geography (12%), Chemistry (10%), and Chemical Engineering (7%) were among the other top five programs (Figure 1).

FIGURE 1
University Enrolment by Environmental Program, 2005



Note: A total of 77,532 students were enrolled in one of the 20 environment-related programs under study.

SECTION 3: RESULTS

3.1 University Enrolment in Environment-related Programs growing at a slower Pace than Overall University Enrolment

Enrolment in both the environment-related programs included in this study and all other programs has grown; however, while the overall university enrolment grew by a record 23.6% between 1999 and 2005, the growth rate in enrolment among the top 20 environment-related programs was considerably slower at 13.6% (Table 2).

In addition, the numbers of students enrolled in the top 20 environment-related programs was 8.1% of total university enrolment in 1999, but subsequently dropped to 7.4% of the total in 2005. See Appendix A for detailed data by program.

TABLE 2
University Enrolment in Canada, 1999–2005

ENROLMENT	1999	2000	2001	2002	2003	2004	2005	CHANGE 1999–2005	RATE OF CHANGE
Top 20 Environment-related Programs	68,325	64,104	62,895	66,273	71,391	75,813	77,532	9,207	13.6%
All programs	847,503	850,581	886,605	933,870	993,246	1,017,588	1,047,705	200,202	23.6%
Share of Top 20 Environment-related Programs	8.1%	7.5%	7.1%	7.1%	7.2%	7.4%	7.4%		

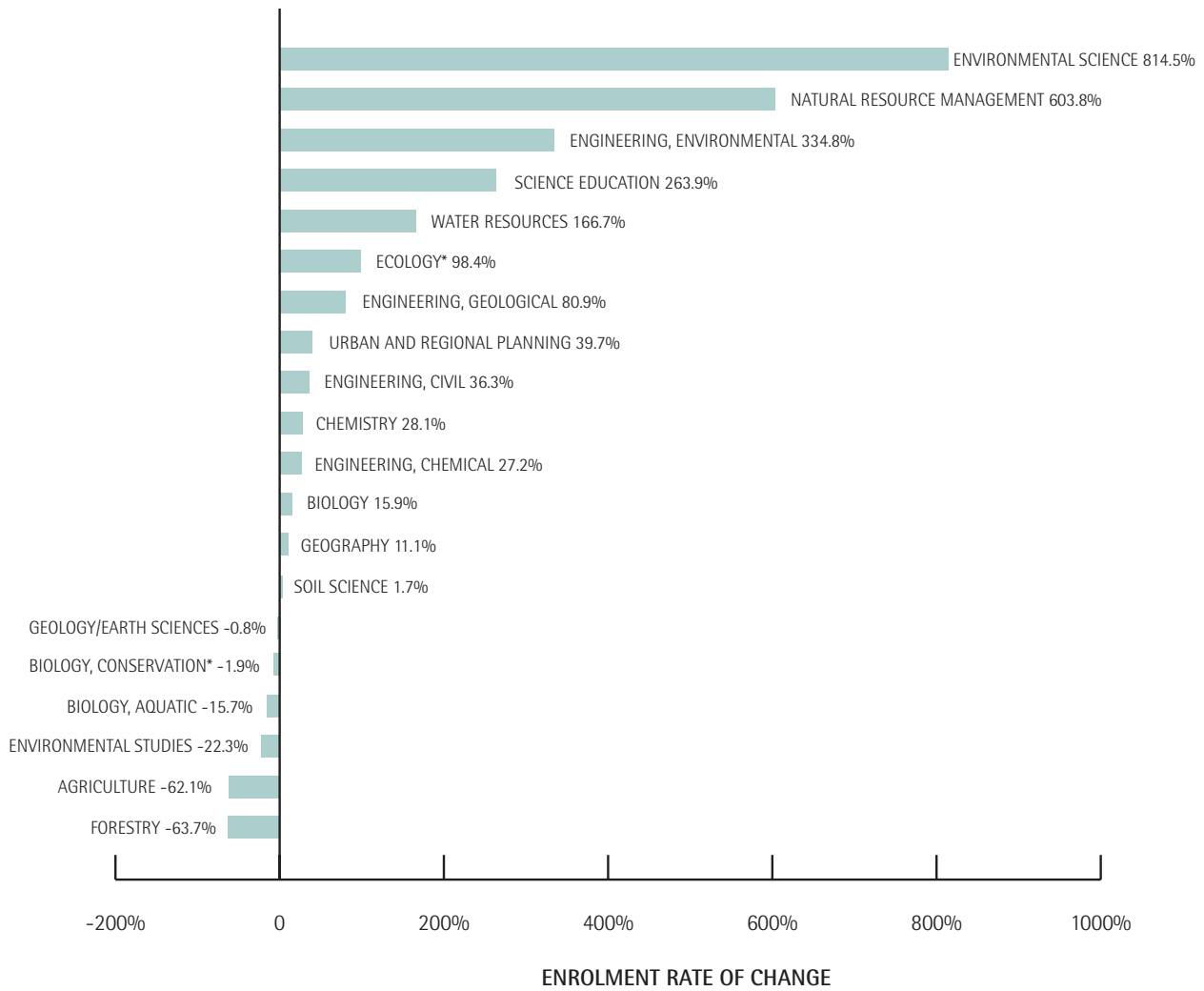
Source: Statistics Canada, Postsecondary Student Information System (PSIS)

In the period from 1999 to 2005, enrolment increased for 12 of the 20 programs included in this study. Environmental Science, Natural Resource Management, Environmental Engineering, Science Education, and Water Resources were the programs with the highest positive rate of change (Figure 2).

On the other hand, Agriculture and Forestry recorded a negative rate of change at -62.1% and -63.7% respectively.

FIGURE 2

University Enrolment Rate of Change for Environment-related Programs, 1999–2005



*Rate of change was calculated from 2001–2005 because no data was available for previous years.

** Rate of change was calculated from 2004–2005 because no data was available for previous years.

Source: Statistics Canada, Postsecondary Student Information System (PSIS)

3.2 University Graduation in Environment-related Programs Decreasing

Overall university graduation rates increased by 24.1% between 1999 and 2005, while graduation from the 20 environment-related programs declined by 9.0%.

In 2005, 7.6% of university graduates completed one of the 20 environment-related programs, compared to 10.7% in 1999 (Table 3).

TABLE 3
University Graduation in Canada, 1999–2005

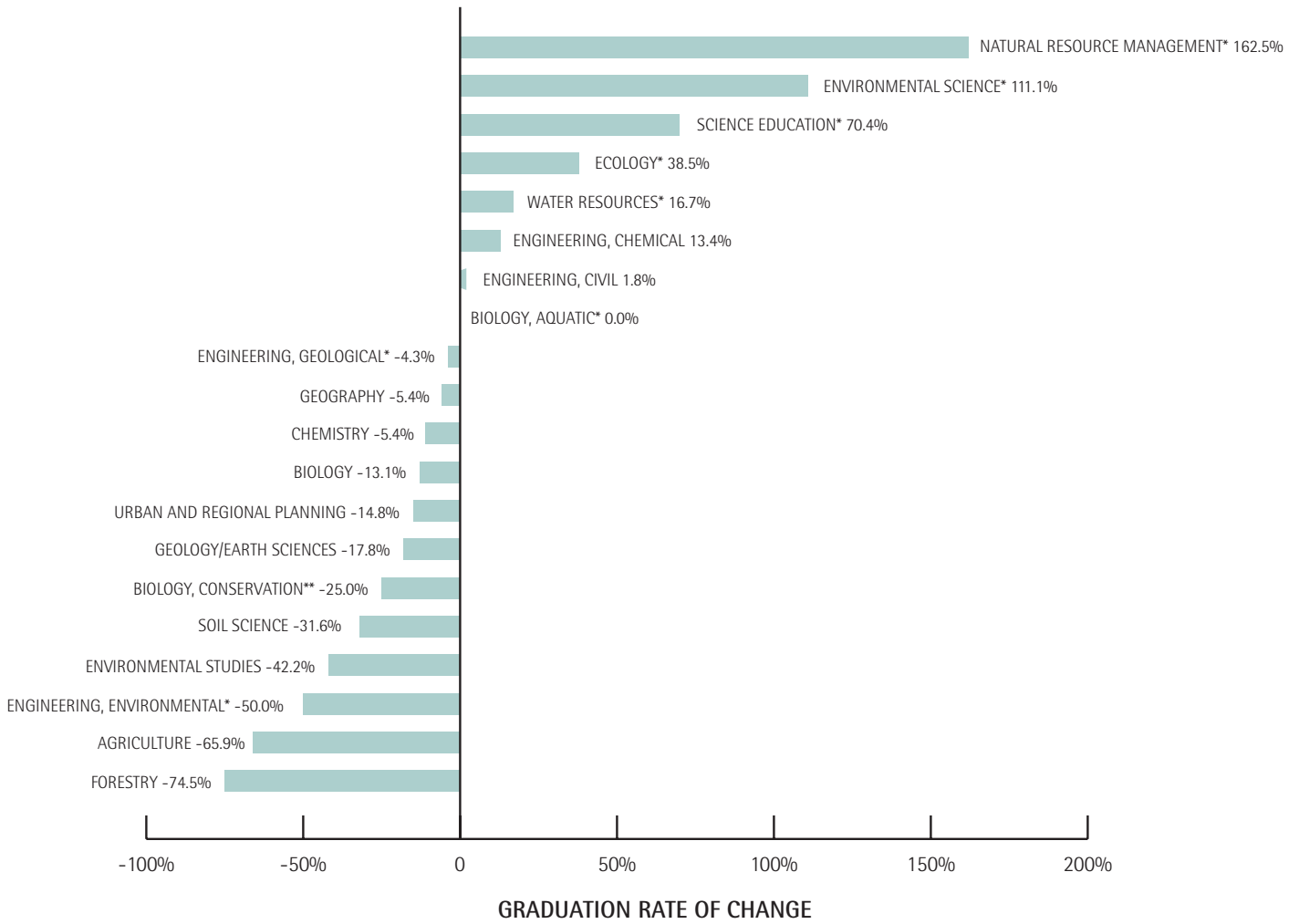
GRADUATION	1999	2000	2001	2002	2003	2004	2005	CHANGE 1999–2005	RATE OF CHANGE
Top 20 Environment-related Programs	18,030	17,823	16,164	15,453	16,152	16,521	16,416	-1,614	-9.0%
All programs	173,577	176,556	178,101	186,153	198,525	210,504	215,367	41,790	24.1%
Share of Top 20 Environment-related Programs	10.7%	10.1%	9.1%	8.3%	8.1%	7.8%	7.6%		

Source: Statistics Canada, Postsecondary Student Information System (PSIS)

Upon examining the 20 specific programs, we found that 12 of the 20 environment-related programs under investigation had a declining graduation rate (Figure 3). The five programs with the lowest rate of change were Forestry (-75%), Agriculture (-66%), Environmental Engineering (-50%), Environmental Studies (-42%) and Soil Science (-32%). On the other hand, Natural Resource Management, Environmental Science, Science Education, Chemical Engineering, and Civil Engineering had positive rates of change between 1999 and 2005. See Appendix A for detailed data by program.

FIGURE 3

University Graduation Rate of Change for Environment-related Programs, 1999–2005



*Rate of change was calculated from 2000–2005 because no data was available for 1999.

** Rate of change was calculated from 2004–2005 because no data was available for previous years.

Source: Statistics Canada, Postsecondary Student Information System (PSIS)

SECTION 4: CONCLUSIONS

Enrolment in all university programs increased by 23.6% between 1999 and 2005. Enrolment in the top 20 environment-related programs also increased, but at a lower rate of 13.6%. In 2005, 7.4% of total university enrolment was among the top 20 environment-related programs, compared to 8.1% in 1999.

In addition, the number of students completing university has never been so high, increasing by 24.1% between 1999 and 2005. In contrast, total environment-related program graduation has decreased between 1999 and 2005 by 9.0%. This declining rate of change suggests that while students are enrolling in environment-related programs, many are not continuing to graduation.

Determining the motivation behind students' decisions to forgo environment-related programs should be a top priority in future research. In addition, further studies should focus on the numbers of students from each program who have obtained environmental employment following graduation. Ultimately, understanding the motivation of students may help to attract more students into environment-related programs, as well as increase the retention of students already enrolled in these same programs.



APPENDIX A: UNIVERSITY ENROLMENT AND GRADUATION DATA, 1999–2005

TABLE A1
Enrolment from Environment-related Programs, 1999–2005

PROGRAM TITLE	1999	2000	2001	2002	2003	2004	2005	CHANGE 1999–2005	RATE OF CHANGE
Agriculture	4,704	3,138	2,706	2,193	2,106	1,959	1,785	-2,919	-62.1%
Biology	24,144	22,938	22,428	23,754	25,803	27,717	27,990	3,846	15.9%
Biology, Aquatic	153	135	144	153	126	123	129	-24	-15.7%
Biology, Conservation**	0	0	0	0	0	159	156	-3	-1.9%
Chemistry	6,156	5,706	5,697	6,240	7,086	7,665	7,887	1,731	28.1%
Ecology*	0	183	183	207	282	372	363	180	98.4%
Engineering, Chemical	4,428	4,497	4,377	4,674	5,124	5,364	5,631	1,203	27.2%
Engineering, Civil	6,723	5,820	6,084	6,963	7,905	8,547	9,165	2,442	36.3%
Engineering, Environmental	69	231	204	240	309	420	300	231	334.8%
Engineering, Geological	141	315	303	282	249	255	255	114	80.9%
Environmental Science	207	858	1,023	1,269	1,482	1,767	1,893	1,686	814.5%
Environmental Studies	5,514	4,851	4,857	4,557	4,638	4,149	4,284	-1,230	-22.3%
Forestry	2,358	1,584	1,188	1,107	969	822	855	-1,503	-63.7%
Geography	8,100	7,980	7,905	8,451	8,721	9,111	9,000	900	11.1%
Geology/Earth Sciences	3,012	2,739	2,682	2,715	2,685	2,706	2,988	-24	-0.8%
Natural Resource Management	78	141	183	231	342	528	549	471	603.8%
Science Education	357	906	834	963	993	1,338	1,299	942	263.9%
Soil Science	177	186	171	147	150	180	180	3	1.7%
Urban and Regional Planning	1,986	1,833	1,863	2,079	2,373	2,580	2,775	789	39.7%
Water Resources	18	63	63	48	48	51	48	30	166.7%
TOTAL	68,325	64,104	62,895	66,273	71,391	75,813	77,532	9,207	13.5%

*Rate of change was calculated from 2000–2005 because no data was available for 1999.

** Rate of change was calculated from 2004–2005 because no data was available for previous years.

Source: Statistics Canada, Postsecondary Student Information System (PSIS)

TABLE A2
University Graduation from Environment-related Programs, 1999–2005

PROGRAM TITLE	1999	2000	2001	2002	2003	2004	2005	CHANGE 1999–2005	RATE OF CHANGE
Agriculture	960	999	669	474	525	525	327	-633	-65.9%
Biology	6,561	6,438	5,808	5,496	5,586	5,811	5,703	-858	-13.1%
Biology, Aquatic*	0	0	39	36	54	45	39	0	0.0%
Biology, Conservation**	0	0	0	0	0	36	27	-9	-25.0%
Chemistry	1,461	1,437	1,359	1,212	1,251	1,329	1,302	-159	-10.9%
Ecology*	0	0	39	36	30	39	54	15	38.5%
Engineering, Chemical	963	1,026	1,056	1,059	1,083	1,086	1,092	129	13.4%
Engineering, Civil	1,674	1,686	1,362	1,416	1,515	1,692	1,704	30	1.8%
Engineering, Environmental*	0	0	72	51	63	75	36	-36	-50.0%
Engineering, Geological*	0	0	69	75	75	48	66	-3	-4.3%
Environmental Science*	0	0	243	324	369	471	513	270	111.1%
Environmental Studies	1,536	1,515	1,137	1,050	1,074	819	888	-648	-42.2%
Forestry	624	711	399	255	297	198	159	-465	-74.5%
Geography	2,652	2,511	2,304	2,232	2,424	2,490	2,508	-144	-5.4%
Geology/Earth Sciences	810	840	735	690	738	642	666	-144	-17.8%
Natural Resource Management*	0	0	48	60	90	138	126	78	162.5%
Science Education*	0	0	294	411	348	429	501	207	70.4%
Soil Science	57	39	63	54	39	39	39	-18	-31.6%
Urban and Regional Planning	732	621	432	489	543	573	624	-108	-14.8%
Water Resources*			36	33	48	36	42	6	16.7%
TOTAL	18,030	17,823	16,164	15,453	16,152	16,521	16,416	-1,614	-9.0%

Source: Statistics Canada, Postsecondary Student Information System (PSIS)

*Rate of change was calculated from 2001–2005 because no data was available for previous years.

** Rate of change was calculated from 2004–2005 because no data was available for previous years.

APPENDIX B: FIELDS OF STUDY OF ENVIRONMENTAL PRACTITIONERS

The list below identifies the fields of study taken by environmental practitioners during their post-secondary studies. It is based on a survey of environmental practitioners, which was conducted by ECO Canada from November 2005 to February 2006. Results from the study were published in the *Characteristics of Canadian Environmental Practitioners 2006*.

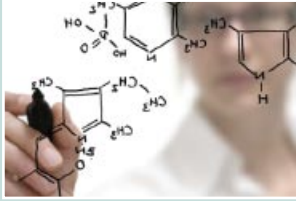
TABLE B1
Fields of Study of Environmental Practitioners

FIELDS OF STUDY	% OF RESPONDENTS
Environmental Science	9.5%
Biology	6.0%
Geography	4.9%
Environmental Studies	4.5%
Engineering, Environmental	4.2%
Chemistry	3.5%
Engineering, Civil	3.3%
Environmental Management	3.0%
Ecology	3.0%
Forestry	2.9%
Biology & Environmental Studies	2.8%
Environmental Technology	2.4%
Geology	2.2%
Engineering, Chemical	2.1%
Other	1.9%
Environmental Earth Science	1.9%
Natural Resource Management	1.8%
Biology, Wildlife	1.6%
Fish & Wildlife	1.5%
Engineering, Other	1.5%
Environmental Engineering Technology	1.5%
Biology, Aquatic	1.3%
Agriculture	1.2%
Water Resources	1.2%
Education	1.1%
Business & Commerce	1.1%
Environmental Assessment	1.1%
Urban and Regional Planning	1.1%
Biology, Conservation	1.1%
Engineering, Mechanical	1.0%
Geographic Information Systems	1.0%
Biology, Marine	1.0%
Environmental Protection	0.9%
Engineering, Geological	0.8%
Administration	0.8%
Soil Science	0.8%
Environmental Planning	0.7%
Biology, Fisheries	0.7%
Political Science	0.7%
Zoology	0.6%
Law	0.6%
Economics	0.6%

Toxicology	0.6%
Renewable Resource Management	0.6%
Hydrogeology	0.6%
Engineering, Bio-Resource	0.6%
Communications Et Marketing	0.6%
Environmental Policy	0.5%
Waste Management	0.4%
Physics	0.4%
Environmental Health	0.4%
Ecosystem Management	0.4%
Botany	0.4%
English	0.4%
Ecosystem Restoration	0.4%
Sustainable Development	0.4%
Sociology	0.4%
Occupational Health Et Safety	0.4%
Land Reclamation	0.4%
Agronomy	0.4%
Terrain and Water	0.3%
International Development	0.3%
Geomatics	0.3%
Environmental Design	0.3%
Psychology	0.3%
Parks Et Forest Recreation	0.3%
Meteorology	0.3%
Computer Science	0.3%
Architecture	0.3%
Science, Pure Et Applied	0.2%
Science, Natural	0.2%
Oceanography	0.2%
Microbiology	0.2%
Biochemistry	0.2%
Anthropology	0.2%
Social Science	0.2%
Landscape Architecture	0.2%
History	0.2%
Health Sciences	0.2%
Entomology	0.2%
Ecotourism	0.2%
Biotechnology	0.2%
Language	0.1%
Human Resources	0.1%
Climatology	0.1%
Biogeography	0.1%
Science, General	0.1%
Outdoor Recreation	0.1%
Journalism	0.1%
Habitat Restoration	0.1%
General	0.1%
Horticulture	0.0%
High School	0.0%
Environmental Control	0.0%
	100.0%

N=2263





ECO CANADA

Environmental Careers Organization
L'Organisation pour les carrières en environnement

Suite 200, 308 - 11th Avenue S.E., Calgary, Alberta, Canada T2G 0Y2

Telephone: (403) 233-0748 Fax: (403) 269-9544

www.eco.ca

Canada 

Funded by the Government of Canada's Sector Council Program