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REVIEW REPORT

on the

NATURAL RESOURCE SCIENCE PROGRAM

SEPTEMBER, 2001

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EXECUTIVE SUMMARY

The Natural Resource Science Program Review Committee found the NRS Program to be a fundamentally sound operation. Its strengths are the commitment, dedication and team spirit of its faculty and support staff. But as with all successful programs, several stresses and strains have developed during its 10-year history.

Major among these is the tension between the generalist focus of the program and the desire evident among about a third of the NRS students for programming leading to specialist designations, particularly that of Registered Professional Forester (RPF). The Committee does not see these two foci as being irreconcilable, and believes that the program can preserve its generalist intent while at the same time catering to the RPF adherents by allowing them to use their electives to gain credit in RPF course requirements. Nevertheless, the issue needs airing at departmental level because it is potentially divisive and because it has led in the past to misrepresentation of the program to incoming students.

Two other major areas for departmental consideration are program structure and curriculum. In the first case, the Review Committee has developed a program structure which reduces the number of credits required to 120, increases the number of free elective courses to five, and at the same time retains the desired outcomes of the program. It hopes that the NRS faculty will give this model serious consideration and implement what is workable. For suggestions on curricular adjustments, the Committee relied heavily on the input of Dr. Dalton, the external representative.

The Review Committee found that the program has been hamstrung over its 10-year existence by a series of situations that can be resolved only at institutional level. Full-time staffing levels have been inadequate to support the program, and the consequent disproportional reliance on part-time instruction has caused problems in instructional quality. Laboratory resources for both instruction and research, strained from the inception of the program, have been put under intolerable pressure with the increases in Science students and faculty in the last 10 years. And while some progress has been made on the labour relations impasse that prevents students being appointed to research assistant positions, the problem remains.

At departmental level, NRS faculty will be addressing various administrative challenges. Institutional and NRS program policies and procedures need to be revisited and enforced; advising and transfer credit review arrangements need to be streamlined and rationalized; and thought should given to the future role of the NRS Advisory Committee.

The Chair of the Review Committee has a special interest in marketing and follow-up, and his ideas are offered in the sections "Employment Prospects" and "Marketing" on strategies that the NRS faculty may employ to maintain the program's market niche and consolidate the network of NRS alumni that already exists.

Programs are protean organisms, constantly in need of review and improvement, and it is in this spirit that the Review Committee offers its observations and recommendations. The Committee would like to reiterate its confidence in the basic structure and operation of the NRS program, and to recognize the hard work put into its development over the last 10 years by its faculty, laboratory demonstrators and support staff.

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BACHELOR OF NATURAL RESOURCE SCIENCE PROGRAM REVIEW COMMITTEE MEMBERS

CHAIR	**Bernie Warren,** **School of Business, UCC**
ASSISTANT CHAIR	**Dr. David Sedgman,** **Chairperson, Agriculture Related Programs, UCC**
EXTERNAL REPRESENTATIVE	**Dr. Sheri Dalton,** **Professor of Biology and Environmental Science,** **Concordia University College, Edmonton, Alta.**
RESOURCE PERSONS	**Dr. Gary Hunt,** **Former Chair, Natural Resource Science, UCC** **John Karakatsoulis,** **Chair, Natural Resource Science, UCC**
DIVISIONAL DEAN	**Dr. Colin James,** **Dean, Sciences, UCC**
REVIEW COORDINATORS	**Dr. Alastair Watt** **Director, Institutional Research and Planning, UCC** **Dorys Crespin Mueller, Research Analyst, Institutional Research and Planning, UCC** **Michaline Novak, Research Analyst, Institutional Research and Planning, UCC**

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CHRONOLOGY OF THE NATURAL RESOURCE SCIENCE PROGRAM REVIEW

The Natural Resource Science Program Review was launched on September 27, 2000, with a planning meeting with members of the Natural Resource Science Department and Institutional Research and Planning to discuss program review procedures and questionnaire design. Guidelines and examples of required documents for the program review were discussed. On December 13, the NRS Department provided draft questionnaires, which were refined and finalized after a further meeting on January 11, 2001.

Stakeholders in the Natural Resource Science Program were surveyed on the following dates:

Former Students (1997-00):	January 19, 2001
Faculty:	January 19, 2001
Employers:	February 1, 2001
Advisory Committee Members:	January 19, 2001
Current Students (2nd, 3rd, and 4th Year):	February 6, 7, and 8, 2001

Reminders were mailed to non-responding former students and Advisory Committee members on February 8, 2001 and to employers on February 21, 2001. Sixty-three percent of the faculty had responded by March 2. The Office of Institutional Research attempted to contact non-responding former students by phone between February 22 and March 6. Non-responding Advisory Committee members were contacted by phone on February 26 and non-responding employers were contacted by phone on March 7.

Former student data from 1996-2000 were summarized from Student Outcomes Reporting System (SORS) data, as provided by the Centre For Education Information, Standards and Services (CEISS).

The cut-off date for all responses was March 23. Information binders were sent to members of the Natural Resource Science Program Review Committee on March 29, and that committee met to analyze the data and form its recommendations on April 19 and 20, 2001.

NRS HISTORICAL OVERVIEW

In 1990, the need for a program that would provide students with a broad and integrated education in the biology and management of natural resources was identified. The novelty of the concept was to have a curriculum that did not lead to specialization in individual resource disciplines, but incorporated all major resource issues in an integrated format for all four years of the degree. In addition, it was to have a strong focus on fieldwork and skills training, and be offered in a cooperative education format.

The first student intake was in September 1992 and the first BNRS degrees were awarded to 14 students in 1996. Application rates increased rapidly and peaked in 1997 with over 100 applications for year 1. With the downturn in the forest industry, applications decreased thereafter and have stabilized at about 40-50 for year 1.

A total of 141 students have graduated in five years and 37 graduates are expected for the 2001 class.

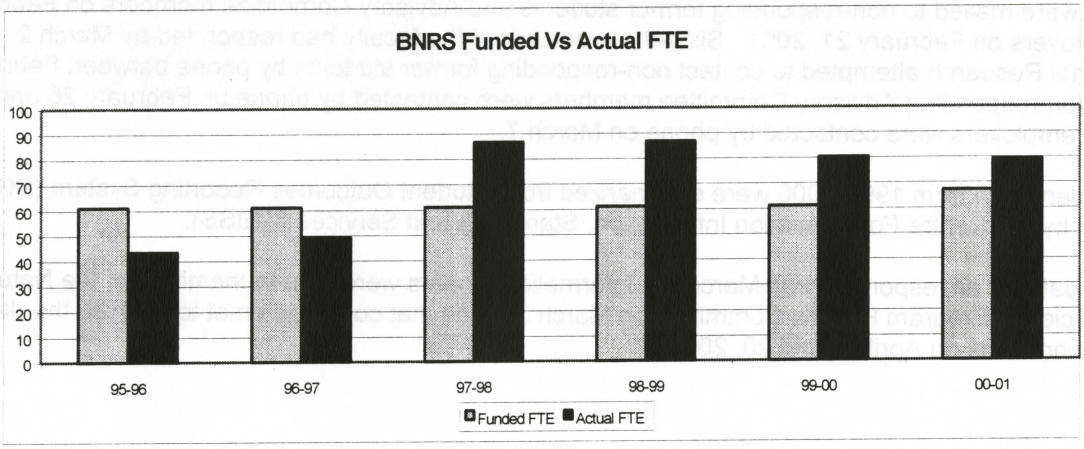
UTILIZATION - FUNDED VS ACTUAL FTE: 1995 - 2000

(Source: UCC Factbooks 1995/96 – 2000/01)

From 1997 to 1999, the NRS Program had a utilization rate of over 130%. Currently the program is being funded for 67 students, but the actual FTE is 79.3 and would be even higher if the Biology cross listing of NRS courses was discontinued. With rates this high it is easy to see why the faculty feel they are overloaded and not getting their fair share of resources.

	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001
Funded FTE	*61.0	*61.0	*61.0	*61.0	61.0	67.0
Actual FTE	*43.5	*49.3	*86.7	*86.9	80.2	79.3
Utilization Rate	**71.3%**	**80.8%**	**142.1%**	**142.5%**	**131.5%**	**118.4%**

**1995-1998 program listed as Bachelor of Integrated Resources*

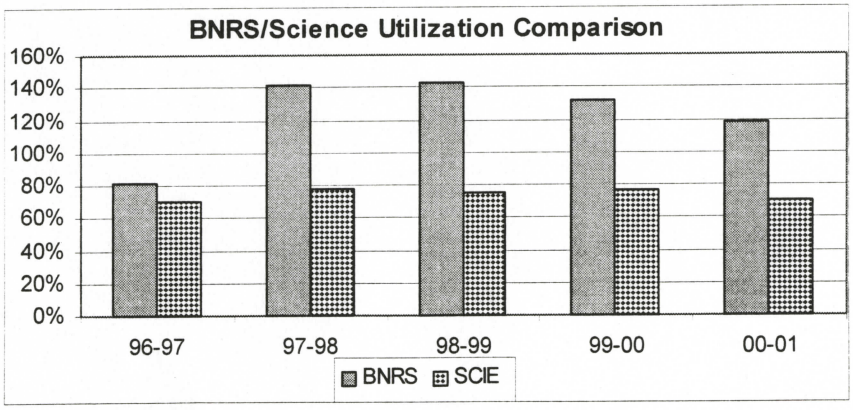


COMPARISON OF BNRS & SCIENCE UTILIZATION - FUNDED VS ACTUAL FTE: 1996 - 2000

(Source: UCC Factbooks 1996/97 - 1999/00 & 2001 FTE Report)

	1996-1997		1997-1998		1998-1999		1999-2000		2000-2001	
	BNRS	**SCIE**	**BNRS**	**SCIE**	**BNRS**	**SCIE**	**BNRS**	**SCIE**	**BNRS**	**SCIE**
Funded FTE	*61.0	856.0	*61.0	866.0	*61.0	866.0	61.0	866.0	67.0	873.0
Actual FTE	*49.3	603.0	*86.7	668.5	*86.9	648.9	80.2	662.2	79.3	615.2
Utilization Rate	**80.8%**	**70.4%**	**142.1%**	**77.2%**	**142.5%**	**74.9%**	**131.5%**	**76.5%**	**118.4%**	**70.1%**

**1996-1998 program listed as Bachelor of Integrated Resources*



SEAT UTILIZATION

The following takes into account the stable enrollment and capacity for the following semesters: fall 1997, fall 1998, fall 1999, and fall 2000
Note: All courses NRSC, FRST, and AGSC courses list in program are included but those courses that offered through Distance Education are not included.

The seat utilization percentage is a measure of the total number of seats occupied in the courses in the program compared to the total seat capacity. This ratio is somewhat suspect since the seating capacity of a course can be affected by factors such as room size and the enrolments of other programs served by the course.

Regardless of its usefulness as a metric, the latest seat utilization rates of the NRS Program (Fall 2000 & Winter 2001) show a 64% for lower level courses, which is poor, and a 91% rate for upper level, which is high. It was explained to the Committee that the reduction in the Forestry Transfer Program is mostly responsible for the poor seat utilization ratio for 1st and 2nd year courses as Forestry Transfer students share several of these courses with NRS students. While the reduction in Forestry Transfer seats is certainly a factor in the poor lower level seat utilization rates, the Committee also feels that the poor resource economy may also be of some influence.

Natural Resource Science Seat Utilization by Year

Year	Lower level enrollment	Lower level capacity (#of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (#of seats)	Total % utilization
1997	246	256	96%	355	374	95%	601	630	95%
1998	226	254	89%	362	395	92%	588	649	91%
1999	141	214	65%	350	412	85%	491	626	78%
2000	156	214	73%	348	377	92%	504	591	85%

Comparison with other Science disciplines for the same period:

Fall 1997

Discipline	Lower level enrollment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (# of seats)	Total % utilization
NATURAL RESOURCE SCIENCE	246	256	96%	355	374	95%	601	630	
CHEMISTRY	481	526	91%	102	133	77%	583	659	88%
BIOLOGY	788	830	95%	235	236	100%	1023	1066	96%
PHYSICS	361	393	92%	34	47	72%	395	440	90%

Fall 1998

Discipline	Lower level enrollment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (# of seats)	Total % utilization
NATURAL RESOURCE SCIENCE	226	254	89%	362	395	92%	588	649	91%
CHEMISTRY	479	489	98%	93	163	57%	572	652	88%
BIOLOGY	808	810	100%	261	311	84%	1069	1121	95%
PHYSICS	385	413	93%	33	50	66%	418	463	90%

Fall 1999

Discipline	Lower level enrollment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (# of seats)	Total % utilization
NATURAL RESOURCE SCIENCE	141	214	65%	350	412	85%	491	626	78%
CHEMISTRY	466	501	93%	109	142	77%	575	643	90%
BIOLOGY	876	900	97%	270	308	88%	1146	1208	95%
PHYSICS	378	431	88%	18	44	41%	396	475	83%

Fall 2000

Discipline	Lower level enrollment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (# of seats)	Total % utilization
NATURAL RESOURCE SCIENCE	156	214	73%	348	377	92%	504	591	85%
CHEMISTRY	487	543	90%	137	153	90%	624	696	90%
BIOLOGY	847	888	95%	295	318	93%	1142	1206	95%
PHYSICS	439	479	92%	27	42	64%	466	521	89%

1997/98 (Fall/Winter)

Discipline	Lower level enrollment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (# of seats)	Total % utilization
NATURAL RESOURCE SCIENCE	532	575	93%	664	683	97%	1196	1258	95%
CHEMISTRY	873	987	88%	192	322	60%	1065	1309	81%
BIOLOGY	1459	1606	90%	511	533	96%	1970	2139	92%
PHYSICS	702	797	88%	55	73	75%	757	870	87%

1998/99 (Fall/Winter)

Discipline	Lower level enrollment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (# of seats)	Total % utilization
NATURAL RESOURCE SCIENCE	466	574	81%	646	689	94%	1112	1263	88%
CHEMISTRY	849	910	93%	158	298	53%	1007	1208	83%
BIOLOGY	1517	1514	100%	507	578	88%	2024	2092	97%
PHYSICS	642	740	87%	51	82	62%	693	822	84%

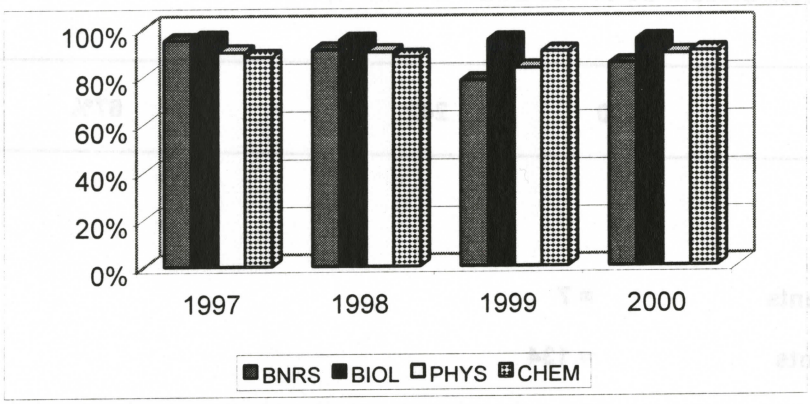
1999/00 (Fall/Winter)

Discipline	Lower level enrollment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (# of seats)	Total % utilization
NATURAL RESOURCE SCIENCE	302	485	62%	591	669	88%	893	1154	77%
CHEMISTRY	828	978	85%	196	288	68%	1024	1266	81%
BIOLOGY	1599	1773	90%	539	598	90%	2138	2371	90%
PHYSICS	691	819	84%	36	70	51%	727	889	82%

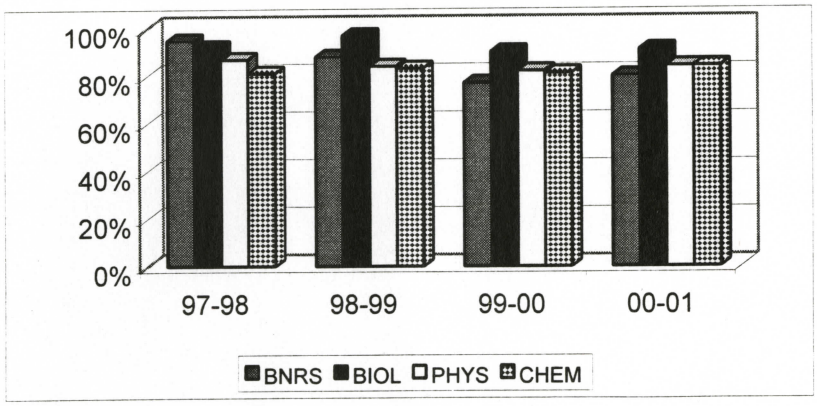
2000/01 (Fall/Winter)

Discipline	Lower level enrollment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (# of seats)	Total % utilization
NATURAL RESOURCE SCIENCE	312	485	64%	594	655	91%	906	1140	80%
CHEMISTRY	812	959	85%	251	304	83%	1063	1263	84%
BIOLOGY	1555	1709	91%	555	599	93%	2110	2308	91%
PHYSICS	735	855	86%	43	68	63%	778	923	84%

Fall Semesters Only



Fall and Winter Semesters



TABULAR SUMMARY OF QUESTIONNAIRE RESPONSES
NATURAL RESOURCE SCIENCE PROGRAM REVIEW

The table below outlines the response rate from the various stakeholders in the NRS Program. It should be noted that 100% of the Advisory Committee and current students responded. The rates for faculty (63%), employers (46%) and former students (54%) were significantly lower, but for employers, within the traditional 40%-50% norm, and for former students, above the historic 40% average. Only the faculty response rate was disappointing, and that may be explained by the high percentage of part-time instructors in the program.

Recipient	# Sent	# Completed & Returned	% Returned*
Advisory Committee	8	8	100%
Faculty	19	12	63%
Employers:	28	13	46%
Current Students: 2nd Year:	21	21	100%
Upper Level 3rd & 4th Year:	46	46	100%
Former Students:	128	65	54%
SORS (BC College and Institutes Student Outcomes Data: 1996-2000)	120	77	64%
TOTAL	**370**	**242**	**67%**

Returned Envelopes:

Former Students **= 7**

Total Non Respondents **= 134**

*The net response rate discounts from the total those in the survey sample who were not contactable.

SUMMARY OF QUESTIONNAIRE RESPONSES

This section attempts to summarize the responses of the various stakeholders who were surveyed.

CURRENT STUDENTS: SUMMARY OF RESPONSES – 2ND YEAR

Most of the positive comments made were about the program diversity, the co-op program, and the support, knowledge and teaching ability of the full time faculty and lab demonstrators. Negative comments seem to centre on limited elective choices, and the teaching skills and availability of the part-time and service faculty. There also appears to be some concern over the balance between forestry and non-forestry courses. Some students wanted more forestry oriented courses and some wanted less emphasis. Some of the more focused concerns were:

- **Admissions & Advising**
  - The comments and ratings for this area were generally very positive. Some students mentioned the need for more speed in arbitrating on transfer credits from other institutions.
- **Structure and Curriculum**
  - Students mentioned the need for more electives. In the first two years of the program there is only room for a single elective.
  - Several students mentioned the need for more fieldwork and practical training.
  - The fieldwork and lab techniques need to be kept up to date.
  - The service courses (math, economics etc.) were not kept in sync with the requirements of the NRS Program and as a consequence the quality of teaching and content varied from year to year.
  - A need to update and improve NRSC 223 – Geographical Information Systems--was identified.
  - The frustration in obtaining the RPF designation was mentioned several times.
- **Resources**
  - Only positive comments were made about institutional resources such as the library and computer labs.
  - A lack of multi media resources (audiovisuals, CD ROMs, etc.) was mentioned.
- **Faculty and Support Staff Resources**
  - Positive comments abounded about full time faculty and support staff. The quality of teaching and content in courses such as FRST 100, ENGL 230, CHEM 110/120 and AGSC 210 was mentioned with the suggestion that they be re-evaluated.
  - The students identified the need for more full time instructors and lab demonstrators.
  - They also rated the faculty's ability to keep up to date as a potential problem.

Student Skills and Abilities

- This group of students identified a wish for more emphasis in the following areas: field techniques (8 responses), computer skills (4), and oral communication, written communication, independent research and information searching (2 each).

CURRENT STUDENTS: SUMMARY OF RESPONSES – UPPER LEVEL (YEARS 3 & 4)

There appears to be a definite concern that the NRS Program makes a student *"a jack of all trades but master of none"*. Somehow the diversity of the program that lower level students appreciated has changed and become a disadvantage to upper level students. As with all programs, there is a problem with a few specific courses most notably ECON 370 (Benefit Cost Analysis), NRSC 223 (Geographical Information Systems) and ENGL 230 (Writing for Science and Technology).

- **Admissions & Advising**
  - Both faculty and advising staff need to have more information on the requirements of the three professional designations, especially those of the Registered Professional Forester.
  - The upper level students gave lower ratings for admissions and faculty advising as compared to the second year students. One interpretation of this is that the process has improved over the last few years. Another interpretation is that the problems of incorrect advising do not become apparent until the upper years.
  - There were several comments on the lack of accountability in faculty advising. If a mistake is made no one seems to take responsibility.

- **Structure and Curriculum**
  - Again there is a strong concern about inadequate elective choices or program options.
  - Many comments were made on the inadequacy of the field skills portion of their education.
  - The need for the opportunity to specialize during the NRS program was another common theme. Some students wished to concentrate on Forestry and a RPF designation while others were more interested in non-Forestry areas of study.
  - There were some comments as to the effect or futility of students evaluating courses.
  - ECON 370, MATH 114, ANTH 219/327, ADVG 420, FRST 100, COMP 135, NRSC 223 – GIS, NRSC 211 – Mensuration and NRSC 200 - Soils, were mentioned as courses that should be re evaluated.
  - The Co-op ratings dropped when compared to those in the Former Student Survey. Eleven percent of the Former Students did not feel that NRS had a strong Co-op program compared to 28% of the Upper Level Students. There did not seem to be a consistent reason for this but lack of support (both in finding jobs and follow up while on the job), the fee charged and too much emphasis on forestry placements were some of the reasons given.
  - Many suggestions were made for possible non-Forestry areas of concentration such as mining, oil, gas, land reclamation, environmental law, environmental impact assessment, self employed business skills, etc.
  - A few students felt that they were not prepared for ECON 370 (Cost Benefit Analysis). They attributed this to either their lack of fundamental economics or the elapsed time between this course and the Microeconomics course in second year.

- **Resources**
  - Some students commented on the lack of NRS journals in the library.
  - Interlibrary loans seem to be well accepted by some students while others have had problems with the process.

- **Faculty and Support Staff Resources**
  - Again mostly positive comments for full time faculty but there is some obvious concern over some of the part-time instructors. The students recognize that the part time faculty have the knowledge but they have difficulty conveying this to the students.
  - A need for keeping up to date with new information and technologies was identified in many areas of the program.
  - The students indicated that more full time faculty and lab demonstrators would be beneficial to the program.

- **Student Skills and Abilities**
  - There was very strong support to put more emphasis on the following: field techniques (25 responses); oral communication (14) and statistical analysis (11).
  - Other areas where increased emphasis was desired included computer skills (6), problem solving (5), advanced lab techniques, written communication (4 each), research techniques, teamwork, information search, and ability to work independently (3 each).

FORMER STUDENTS: SUMMARY OF RESPONSES

Of the 65 alumni who answered the survey, one in five (20%) had continued to further study: 14% in graduate work and 6% in speciality education. In addition, almost 70% of respondents are employed in the NRS field.

- **Admissions & Advising**
  - Many comments identified the need to "lock-in" the number of credits required to obtain Registered Professional Forester (RPF) status.

- **Structure and Curriculum**
  - A need for more field skills especially in map, compass and surveying, was identified.
  - Again the trade-off between program diversity and focus was evident.
  - The fieldwork and lab techniques need to be kept up to date.
  - Opportunity to specialize during the NRS Program was another common theme. Some students wished to concentrate on Forestry and a RPF designation while others were more interested in non-Forestry areas of study.

- Many suggestions were made for possible non-Forestry areas of concentration such as mining, oil, gas, land reclamation, environmental law, environmental impact assessment, self employed business skills, etc.
- The evaluation of faculty was mentioned more than once as students felt that they provided input on the faculty and program in many instances but were not informed of the "follow through".
- The service courses (math, economics etc.) were not kept in sync with the requirements of the NRS Program and as a consequence the quality of teaching and content varied from year to year.
- Many respondents mentioned that they were not satisfied with the quality of instruction that they received from the large group of part time instructors. Most identified the problem as being related to the following:
  - Lack of teaching skills
  - Time restraints: most PT instructors had "day jobs" which are their primary focus
  - Night classes: not conducive to learning
  - Lack of access to PT instructors.

- **Resources**
  - The Library received relatively low ratings from former students.
  - Computer resources were also mentioned as inadequate.

- **Outcomes**
  - Some students felt that the lack of an opportunity to specialize hindered their ability to obtain employment. Others were very happy with the broad scope of the program.
  - The lack of specialization and of elective opportunities was also mentioned.
  - The Co-op program was generally well regarded.
  - A desire for more fieldwork and practical skills was again mentioned (GPS, GIS, etc.).

- **Student Skills and Abilities**
  - The students were very unified (26 responses each) in their wish for upgraded field technique opportunities and statistical analysis skills.
  - There was also strong endorsement for offering more training in the following:
    - Oral communication skills
    - Problem solving skills
    - Computer skills
    - Independent research skills
    - Written communication skills/report/proposal writing skills
    - Advanced laboratory skills.

PROGRAM ADVISORY COMMITTEE: SUMMARY OF RESPONSES

All eight advisory members felt the program provided a very strong foundation due to its diversity – but had major problems because of a lack of full-time faculty members. There were also a few comments regarding the inadequacy of communication between the department chair and advisory members. There seemed to be a lack of follow-up, and one ex-advisory member commented that he would have liked a thank-you note at the end of his two-year tenure.

- The Advisory Committee has not been a functional entity in recent years.
- Three items received less than satisfactory ratings from committee members:
  - Inadequate communication between the department chair and the committee members
  - An inappropriate number and mix of members
  - Frequency of meetings
- A large proportion (40% to 50%) answered "Don't Know" to the questions concerning the NRS students.
- Timely agendas and follow up and action on minutes need to be addressed. The Advisory Committee has evolved from a body that gave advice on the creation of the NRS Program to one that aids in the "fine tuning" of the program. Some thought needs to be given as to the future of this committee.

EMPLOYERS: SUMMARY OF RESPONSES

Of the 13 employers responding to the survey, 84% were involved in government service, and 84% had hired a UCC NRS graduate in the last five years. The major improvement that the surveyed employers commented on was the need for improved writing and communications skills. A few also mentioned project planning, budgeting and computer skills as areas for improvement.

- **Student Skills and Abilities**
  - Rating scores under 4.0 ("Satisfied") occurred in the following areas:
    - Field techniques→3.86 (Co-op)
    - Statistical analysis skills→3.13 (Co-op) and 3.80 (non Co-op)
    - Problem solving skills→3.50 (Co-op)
    - Ability to work independently→3.86 (Co-op)
    - Ability to plan the day effectively→3.75 (Co-op)
    - Written communication skills→3.63 (Co-op) and 3.80 (non Co-op)
    - Oral communication skills→3.88 (Co-op)
    - Computer skills→3.63 (Co-op).

However, it should be noted that only seven employers, or half the respondents, completed this section, which renders any generalization about skill and ability levels somewhat suspect.

- **Curriculum**
  - There were many suggestions as to what to add to the curriculum including more forestry related courses, more critical thinking, planning, project management, statistics, experimental design, data analysis, writing and communication skills.
  - More full time staff would lead to a more balanced curriculum
  - The issue of a RPF stream was raised again.

CO-OP PLACEMENT EMPLOYERS AND STUDENTS: SUMMARY OF RESPONSES

- Overall, the Co-op employers were quite happy with the NRS students.
- The same themes of the need to improve technical skills, writing and oral communication skills were repeated.
- Twenty-two of 52 NRS Co-op students in the student self-evaluation survey responded that the co-op experience confirmed their academic career goals.
- Skills that made the co-op experience more valuable included:
  - Good interpersonal skills
  - Showing interest and initiative
  - Being safety conscious and willing to pay close attention to information given to them by co-workers and supervisors
  - Being in good physical shape
  - Having good computer skills.
- The Co-op coordinator needs to fully explain the report/evaluation that the student is required to hand in at the end of the co-op placement. She also needs to explain fully the co-op position to the student prior to placement. Check-in sessions during the co-op placement by the Co-op Coordinator would also be appreciated.
- It was also mentioned that the students would like to have more of a variety of co-op placements as opposed to so many Forestry-related positions.
- The Co-op fee was a problem for some students.

FACULTY & SUPPORT STAFF: SUMMARY OF RESPONSES

Eight full-time and four part-time faculty responded to the survey and the general consensus was that at minimum one additional full time faculty member and a lab demonstrator are required. Typical comments were *"the NRS Program graduates more students than all of Science does in any given year. But Science has far more faculty than we do."*

- **Objectives of the Program**
  - The inappropriate number of full-time faculty is limiting the ability of this program to achieve its goals and objectives.
  - A strategic plan for the future is needed.

- **Admissions & Advising**
  - Faculty rated this process quite highly, but they comment that advising can be inconsistent at times.

- **Structure and Curriculum**
  - Faculty members have concern over the lack of an adequate number of electives.
  - They also indicated that more flexibility to respond to current trends is needed.
  - In sharp contrast to the student surveys, the faculty felt that the field component of the program was very good. This interpretation may not be accurate in that the students are asking for more practical field techniques and skills whereas the faculty may be viewing the field courses as outdoor demonstration experiences.
  - Again there is a contrast between the students' and faculty's view of lab courses. The students mention the need for more lab techniques and independent research skills whereas the faculty feel that they are doing a good job in this area.

- **Resources**
  - Research facilities are virtually non-existent, which is a huge impediment to the development of the NRS Program.
  - Overall, laboratory space is lacking.
  - The program is under-funded for supplies and materials.
  - The library received mildly positive support but there is an indication that faculty felt the library services could be improved.
  - The faculty were very negative on the following items:
    - sufficient professional development time and funding to maintain currency in their discipline
    - sufficient funding for research
    - sufficient time to conduct research.

- **Articulation and Liaison**
  - Communication between NRS and Biology could be improved.
  - The conflicts with CUPE have limited student opportunities to pursue summer work within the NRS Program.

- **Outcomes**
  - The faculty felt that generally the NRS graduates are well prepared for career success and that Co-op students have a definite educational advantage.
  - A major strength of the NRS Program is its broad-based curriculum.

- **Student Skills and Abilities**
  - All student skills and abilities received a ranking of above average.
  - One respondent mentioned the need for more scientific writing and information- gathering skills.

- **Other Comments**
  - The program must constantly make students aware of existing and impending environmental issues.
  - Cycles in the Forest industry behoove the NRS Program to seek a better balance of forest and non-forest related courses.
  - The NRS Program needs to be aware of developing programs at other institutions and position itself to continue to attract suitable students.
  - Many comments emphasized the fact that a small full-time faculty and minimal physical space for labs and research are having a negative impact on the program, which will get worse if it cannot be addressed in the near future.
  - Some comments were made at the lack of support from the office of the Dean in the area of the cross listing of NRS courses under Biology Department numbers.
  - A comment was made that the policies for attaining a C+ minimum or maintaining a 60% average to stay in the program are not fully enforced. This leads to a lowering of academic standards and impacts on the credibility of the program.

STRENGTHS OF THE NATURAL RESOURCE SCIENCE PROGRAM

The major strengths of the program include:

- **Competent, concerned, and conscientious faculty and lab assistants with a real team spirit. It was pointed out many times that faculty and lab demonstrators genuinely care and are always willing to help;**
- **Commitment to high academic standards and excellence in teaching with a very solid and growing research component;**
- **Relatively small classes which allow good student/faculty interaction, especially in upper division courses;**
- **A Co-op program which provides applicable work experience in support of the educational theories delivered;**
- **A mix of theory, applied and hands-on practical skills with the intent to produce a well rounded practitioner;**
- **Dedicated and influential alumni who have moved on to resource management positions and graduate school;**
- **Excellent co-operation between faculty and lab demonstrators;**
- **Graphically, the best web site in all of UCC Sciences.**

AREAS OF THE NATURAL RESOURCE SCIENCE PROGRAM WHICH CAN BE IMPROVED (WITH RECOMMENDATIONS)

The Review Committee identified the following aspects of the Natural Resource Science Program as being in need of improvement.

1. PROGRAM FOCUS

The Natural Resource Science Program, as defined by Gary Hunt, is a broad and integrated study of Biology, Ecology and Management of the Natural Resource sector. This diversity, which should be communicated to all the stakeholders (public, government, native, corporations), has caused a perceived lack of focus with the program. It seems that both students and employers are not sure whether the NRS Program is for the professional biologist, agronomist or forester. In reality, the NRS Program tries to cater to all three professional designations. Upon completion of the degree students are short:

One course for a Registered Professional Agronomist (PAG)
Four courses for Registered Professional Forester (RPF):

- Silviculture II
- Forest Economics
- Harvesting (sometimes called Forest Operations)
- Integrated Resource Management.

The real problem is the Registered Professional Forester (RPF) designation. The RPF is a charter within British Columbia and Alberta, which gives RPF's a right to title and practice. This means that to practice forestry management in Alberta or BC, one must be an RPF. But the RPF organization is not as stringent as similar engineering, accounting or law designations. It also appears that the designation is somewhat controlled by the University of British Columbia.

SHORT TERM RECOMMENDATION

a) **At minimum, the required courses for the three professional designations must be clarified and should be clearly stated in the NRS web pages. In addition, the Department Chair should work with the three professional designation bodies in an attempt to reduce the number of additional courses required by the professional designation organizations.**

ACTION: NRS Chair and Faculty

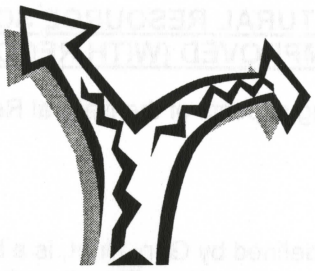
The NRS Department is in process of having the Integrated Resource Management course waived as a RPF requirement on the basis that the NRS Program is essentially an Integrated Resource Management program. Apparently one NRS student has already successfully argued this. Other appropriate professional designations should be investigated, especially in land use planning or range management.

LONG TERM RECOMMENDATION

b) **In the long term, faculty should review the original strategic initiative of the NRS Program. Perhaps this focus of "*having a curriculum that does not lead to specialization in individual resource disciplines, but incorporates all major resource issues in an integrated format for all four years of the degree*" is inappropriate in today's environment.**

One possible approach would be to have a core set of courses, which provide the foundation knowledge and skills incorporating the necessity of balancing the "*triple bottom-line objectives*" of environmental, social and economic studies. All students would take this core and then select an area of specialization, such as forestry, range management, agriculture, conservation, or watershed management. Completion of the core and a specific concentration would give students the requirements for the appropriate professional designation.

Specialization #1



Specialization #2

Core - first three years

These concentrations could be used to generate additional income by becoming a postgraduate certificate program for professional upgrading purposes. This series of undergraduate / post graduate specializations would support UCC strategic planning initiative of "life long learning" and prepare the NRS Program for possible graduate programs if full University status is ever obtained.

ACTION: NRS Chair and Faculty

2. PROGRAM STRUCTURE

A major concern of all faculty and students surveyed was the lack of elective choices and the 126-credit graduation requirement instead of the traditional 120 credits for a baccalaureate. The Review Committee spent considerable amount of time wrestling with these and other course specific issues and arrived at the following suggestion. This suggestion decreases credits required to graduate to 120 while at the same time increasing the number of electives to five (six for some students).

Semester 1	Semester 2
Biology 111 – Principles of Biology I	**Biology 121– Principles of Biology II**
English 110 – Composition - Students who obtain B or better in **English 110** do not need to take **Eng. 111**. Those who do not obtain the B in English 110 must take English 111 as an elective before starting **English 230**.	**Forestry 100 – Introduction to Forestry** Options - Make a 3-credit course. - Make more rigorous – introduce NRS issues, set the tone for the whole program. Maybe even rename to Intro to Natural Resource Science - Use core faculty to teach course but bring in experts from field for guest lectures - Pick key issues (soft wood lumber agreement, an environmental/industry pollution conflict, etc).
Forestry 112 – Dendrology I - Change descriptive name from Dendrology 1 to Forest Botany 1 to better reflect wider content	**Forestry 122 - Dendrology II** - Change descriptive name from Dendrology 2 to Forest Botany 2
Math 115 – Calculus for Biological Science	**Comp 135 – Information Systems & Data Analysis** Options - Eventually, make computer skills a prerequisite for the NRS Program and don't offer COMP 135 - Offer Prior Learning Assessment option and/or allow students to challenge the course - Teach the skills encompassed in operating the MS Office suite including database management, PowerPoint presentations and even growth and yield simulations in Excel
Chemistry 110 – Principles of Chemistry I - Previously in semester 3	***Chemistry 120 – Principles of Chemistry II*** - Include material on soil analysis - Moved from semester 4
15 credits	***15 credits***

Semester 3	Semester 4
Biology 300 - Biometrics	**Forestry 211 - Forest Mensuration** - needs to be upgraded with more field work - incorporate compass and map work
Forestry 210 - Forest Ecology and Silvics I	***Forestry 220 - Forest Ecology and Silvics II***
Forestry 200 - Introduction to Soils - Needs to be modernized and upgraded with more emphasis on soil analysis	***Economics 190 - Microeconomics***
NRSC 223 - Geographical Info Systems - Needs major upgrade in equipment, software and modern methodology - Incorporate compass and map work - Look at re-vectoring the course – pool the lecture time. One possible vector is 2, 2, 2, with two hour combined lecture, 2 hours seminar with faculty and two hours on their own. An alternative is 2,0,3. - Investigate ways of cutting down instructor lab time	**English 230 - Writing for Science and Tech** - Redesign course to include - Communication skills o Oral Presentations o Presentations in a Court of Law o Running meetings/minute taking - emphasis on scientific writing o report writing o writing research papers o proposal writing o resumes - record keeping Note: could look at replacing ENGL 230 with ENGL 229, which cover some of the missing components.
Elective (Geology? Geography?)	**Elective**
15 credits	**15 credits**

Semester 5	Semester 6
ADVG 420 – Rec/Tourism Management - need to revisit this course with the current instructor to ensure the goals of the NRS Program are being met	**NRSC 320 – Silviculture**
Biology 303 – Population Biology	**NRSC 326 – Limnology**
NRSC 300 – Evolution and Ecology of the Vertebrates	**NRSC 403 – Pathology** - rename it "Forest Pathology" or make it broader to include plants (and animals?) other than ones with a Forestry connection.
NRSC 311 – Range Ecology	**NRSC 402 – Entomology**
NRSC 317 – Ichthyology	**One of:** - ***Econ 370 - Cost Benefit Analysis*** o redesign course to become "Forest Economics" and RFP accredited. - ***Econ 371 - Economics of the Environment*** - ***Econ 374 - Land Economics***
15 credits	**15 credits**

Note: Third Year Semester 5 and Third Year Semester 6 can be switched for Co-op purposes.

Semester 7	Semester 8
NRSC 325 –Natural Resource Field Studies - *incorporate more GIS, GPS, map and compass work*	**NRSC 413 – Fire Ecology and Management**
One of the following two courses: - ***NRSC 321 -Rangeland Management*** - ***NRSC 410 - Fisheries Management***	**One of the following two courses:** - **NRSC 322 – Wildlife Management** - **NRSC 411 – Watershed Management**
One of: - **ANTH 327 - First Nations Resource Management** - **ANTH 219 – Ancient North Americans** Need to revisit these courses with the Anthropology faculty Modern issues need to be emphasized o Treaty rights o Land claims o Current legal issues o How to consult with First Nations	**NRSC 421 – Conflict Resolution in Natural Resource Management** - add Risk Management
Elective	**NRSC 423 – Graduating Essay**
Elective	**Elective or Policy Capstone course**
15 credits	**15 credits**

Note: Introduction to Food Production (AGSC 210) could be offered as an elective.

**** All courses need to incorporate oral presentations, scientific writing, statistics and field techniques such as GIS, GPS, compass and map work wherever possible.****

ACTION: NRS Chair and faculty

3. CURRICULUM – OTHER SUGGESTIONS

- The elective courses or courses with two options, e.g. NRSC 410 (Wildlife Management) or NRSC 321(Watershed Management) could be offered in alternate years.
- Other areas that would be useful to cover:
    - ISO standards, especially ISO 14000
    - Environmental law
        - NAFTA
        - Trans boundary issues
        - Forest Practice Code
        - Software Treaty
        - World Trade Organization
    - Risk assessment
    - Oil/Gas/Mining
    - Land Reclamation
    - Environmental Ethics
    - Legal issues
        - Legal records
        - Court appearances
        - Client rights
        - Expert testimony
    - Communication Skills
        - Debate
        - Conflict Resolution and Arbitration
        - Media Relations and presentation skills.

- A Fourth Year Semester 8 "Capstone" course which would incorporate many of the above topics and help integrate the various areas. This capstone course would replace an elective.
- Field School at end of Semester #4. The timing of this field school is of concern. Could field school incorporate mensuration?

- Service courses. Teaching of service courses is inconsistent. The content and delivery methods seem to be at the discretion of the instructor and not coordinated with the chair of the NRS Program. This results in inappropriate content and overlap.
  - Appears to be a need for a treaty / native studies course specifically for NRS students as opposed to the anthropology courses (ANTH 219 – Ancient North American Indians and/or ANTH 327 – First Nations Resource Management) currently offered.
  - Also need for a Forestry Economics course approved by the Registered Professional Forestry Institute. This would replace the current Cost Benefit Analysis course and be alternated with the Land Economics course.
  - Introductory chemistry courses should have a set of labs specifically for NRS students covering soil chemistry.
  - Service courses – should be revisited with the faculty from the Computer Science and Tourism Management departments and ensure that NRS objectives are being met. This should be done annually to ensure proper scheduling and content delivery.
    - COMP 135 – Information Systems and Computerized Information Analysis;
    - ADVG 420 – Recreation and Tourism Management and
    - ENGL 230 – Writing for Science and Technology. There was a need to bring the content up to industry standards. This includes the need to add proposal writing, especially in accordance with FRBC outlines, maintaining legal records; journal skills, panels and debates; opposite side papers and discussions – recommended textbook – "Taking Sides". This course could also include how to chair meetings and write minutes, letters, memos and email.
- Very inadequate Geographical Information Systems Infrastructure. GIS is a very hardware intensive program and a critical part of any natural resource program. Continual investment in hardware, software and faculty training must be established if GIS skills are to be a core competency.
  - The Co-op program requires advanced notice of any scheduling changes. This is especially true with course changes due to part-time faculty. This should be tightened up.
  - Beef up FRST 100 – Introduction to Forestry to the same level of challenge that other first year courses have. Topics to consider adding include ISO 1400, Kyoto Environmental Agenda, Pollution standards, etc.

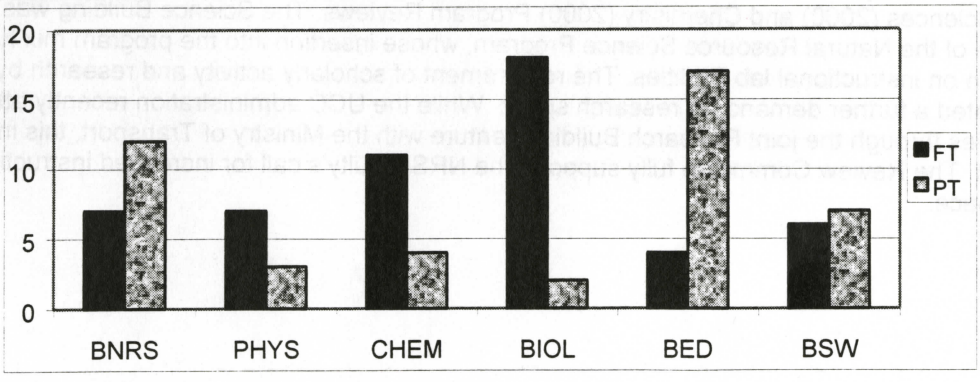
ACTION: NRS Chair and faculty

4. STAFFING

The part-time/full-time staffing ratio in the NRS Program is 12:7, or almost 2:1. This compares unfavourably to the ratio in Biology (2:18); in Chemistry (4:11); in Physics (3:7) and, to cite another professional degree program, in Social Work (7:6). Only Education has a greater preponderance of part-time faculty (17:4), and that situation may be explained by the number of teaching practica supervisions required in that program.

Faculty Headcounts by Program as of November 2000

	FULL TIME	PART TIME	TOTAL
NATURAL RESOURCE SCIENCE	7	12	19
PHYSICS	7	3	10
CHEMISTRY	11	4	15
BIOLOGY	18	2	20
EDUCATION	4	17	21
SOCIAL WORK	6	7	13



The nucleus of seven full-time NRS faculty has clearly been stretched to its limits in providing the instructional and administrative coverage required in a program of this nature. Testimony from all faculty indicates a state of overwork in the last five years, with predictions of declining instructional effectiveness and research productivity unless they are reinforced.

The situation was helped by the hiring in summer, 2001, of an additional faculty member to teach Rangeland Management and related subjects, which will reduce the part-time faculty complement by half. However, this is only a sessional position, and the incumbent cannot be expected to stay with the university college if paid for only nine months in the year. Furthermore, a convincing case can be made that, with its field trip components, NRS has greater need of an additional lab demo than Biology, Chemistry or Physics. Currently, NRS has a third lab demonstrator in place, but that position is term-certain, with no guarantee of continuation beyond April, 2002.

RECOMMENDATION

(a) that the Dean, Sciences, and the Vice-President, Academic, find sufficient funds to convert the sessional appointment in Rangeland Management to a full-time, on-going appointment, and the term-certain laboratory demonstrator position to a full-time, on-going sessional appointment.

ACTION: Dean, Sciences; VP Academic

5. PART-TIME INSTRUCTION

Current and former students report being frustrated by poor part-time instruction, evening scheduling of classes, and unavailability of instructors. While they freely acknowledge that part-time instructors are practising experts in their own fields, that expertise does not always translate into good classroom delivery. In mitigation of this criticism, part-time instructors undertake their teaching duties over and above their regular jobs, and are in some cases delivering their courses as a favour to the NRS Department. As well, with the hiring of the Rangeland expert, part-time instruction has been reduced substantially. However, the issue will remain, albeit in diminished form.

RECOMMENDATIONS

(a) The Chair, NRS, ensure that regular formative evaluations of all part-time faculty take place, and provide each part-time faculty member with face-to-face feedback which should be used as a basis for developing individualized plans for instructional improvement; these plans could include some of the options listed in Section 6.1.4 of the Collective Agreement, such as one-on-one facilitation (6.1.4.1), colleague assessment (6.1.4.3) and videotaping (6.1.4.4), or attending an Instructional Skills Workshop.

ACTION: Chair, NRS

(b) Full-time NRS faculty systematically mentor part-time faculty and provide them with guidance and advice in instructional matters.

ACTION: NRS full-time faculty

6. LABORATORY RESOURCES

Both students and faculty expressed frustration with the lack of lab facilities—a complaint already documented in the Biological Sciences (2000) and Chemistry (2000) Program Reviews. The Science Building was designed prior to the existence of the Natural Resource Science Program, whose insertion into the program mix has placed an intolerable strain on instructional lab facilities. The requirement of scholarly activity and research by upper level faculty has created a further demand for research space. While the UCC administration recently attempted to rectify these deficiencies through the joint Research Building venture with the Ministry of Transport, this initiative appears to have aborted. The Review Committee fully supports the NRS faculty's call for increased instructional and research lab space.

RECOMMENDATIONS

(a) The Dean, Science, and the Vice-President, Administration and Finance, seize interim opportunities to increase lab space for instruction until the conversion of the old Library space to teaching space in 2004-05.

ACTION: Dean, Sciences; VP, Administration and Finance

(b) In conjunction with other Science Departments, the NRS Department press for UCC relationships with corporate and government sponsors to develop joint research facilities with dedicated space for UCC faculty. The Department should also work with other departments and the UCC Foundation to create endowment funds for research facilities.

ACTION: NRS Department

7. LABOUR RELATIONS

With CUPE's refusal to recognize student research fellowships it has become extremely difficult and an administrative nightmare to hire students on faculty research grants. The students lose an opportunity to perform research first hand and finance a portion of their education. The faculty lose critical research opportunities since they cannot afford to hire student researchers. The institution's loss of reputation as a research institution will certainly hurt its chance of reaching university status. Eventually, UCC may even suffer from a loss of potential income.

RECOMMENDATION

(a) The UCC Executive and the Director, Human Resources, must seek a speedy resolution to CUPE obstruction of the allocation of Federal research grant monies to UCC students.

ACTION: UCC Executive; Director, Human Resources.

8. PROGRAM AND INSTITUTIONAL POLICIES

Students pointed out several lapses in the NRS Department's administration and implementation of program and institutional policies:

- Instructors failing to return graded papers and projects within a reasonable time;
- Plagiarism policies not enforced;
- Extensions in paper or project deadlines being granted selectively to students;
- Potential conflict of interest situations among faculty.

Faculty themselves identified a need to revisit program exclusion and re-entry policies.

RECOMMENDATIONS

(a) That the Chair, NRS, encourage NRS faculty, both full-and part-time, to observe the spirit of professional protocol by enforcing assignment deadlines impartially and returning graded papers and projects within the three-week turn-around period customarily allowed for marking;

(b) That the Chair, NRS, ensure on a regular basis that all NRS faculty, both full- and part-time, are made aware of and enforce UCC policies concerning plagiarism;

ACTION: Chair, NRS

(c) That the NRS Department revisit departmental promotion, exclusion and re-entry policies with a view to clarifying and adjusting them if necessary.

ACTION: NRS Department

In addition, in order to improve student familiarity with and adherence to the conventions of scientific writing, the Committee recommends that:

(d) The NRS faculty adopt a policy of introducing their students to scientific writing and standard bibliographic conventions in their first year, and ensure that the instructors of service courses such as ENGL 110 and ENGL 230 are informed of, and teach, the system preferred by the NRS Department.

ACTION: NRS Department

To create consistency, UCC has adopted a policy of standardizing course outlines. This consistency ensures that logos are used correctly and that the outline can be easily transferred to the web. The Committee noted that there is considerable variation between individual course outlines in the Department, and recommends that:

(e) The NRS Department revise its outlines to meet the UCC standard so that these course outlines may be web enabled.

ACTION: NRS Department

9. ADVISING AND TRANSFER CREDIT ARRANGEMENTS

From the survey and interviews there appears to be some inconsistency in student advising between NRS faculty, the chair, and Academic Advising. This inconsistency can result in improper course selection and/or the perception of preferential treatment.

There also seems to be some problem in the process of assigning transfer credits from institutions that are not in the BC Transfer Guide. This process can be very time consuming and involve the chair, specific faculty and the student, but it is critical that a decision is made as soon as possible so the student can make appropriate course selection.

RECOMMENDATIONS

(a) All NRS advising information should be verified by the Chair and placed on the NRS web site. This would allow students, staff, faculty and academic information access to the most up-to-date information available. UCC must start moving away from calendar copy advising and reach the point where the website has the most up-to-date information.

(b) To ensure greater consistency and reliability in dissemination of program information, student advising in the NRS program should be handled by no more than two full-time faculty (the chair and one other).

(c) These two faculty should be ultimately responsible for approving incoming transfer credits to the NRS program.

ACTION: NRS Department

10. GRADE DISTRIBUTIONS

Although most courses in both the lower and upper levels seem to have acceptable grade distributions, there are a few anomalies. In a "closed" degree program such as this, it is these anomalies that can have a large impact on the perception of the program. Courses with an inflated grade distribution tend to "water-down" the program, and difficult courses can cause students to over-compensate and spend an inappropriate amount of time, thereby affecting their performance in other courses in the program.

Lower Level Courses:
There is a wide variation in the percentages of courses in which students receive an A- or better. This ranges from a low of 18% for Dendrology I (FRST 112) to a high of 75% for Geographic Information Systems (NRSC 223). Except for Dendrology (FRST 112), the percentage of students who receive a D or lower is consistently under 5%. Dendrology I is certainly the anomaly with almost 20% of the students receiving a D or lower.

Upper Level Courses:
There is also wide variation in grade distribution for upper level courses. The percentage of students receiving an A- or better ranges from a low of 24% for Limnology (NRSC 326) to a high of 68% for Wildlife Management (NRSC 322).

As expected, the percentage of students who receive a D or lower for upper level courses is insignificant. In fact, of 15 upper level courses, 12 have never had a D or F grade in the six years we have the data for (1995/Fa – 2000/Fa).

RECOMMENDATION

(a) Grade distributions are one of the key indicators of student workload and success and as such they should be continually monitored. Each faculty member prior to submitting the final grades to the Registrar should fill out a simple grade distribution report that is sent to the Chair. These grade distributions can be easily kept in an Excel spreadsheet so they can be plotted over time. They also become useful as guidelines for new faculty.

ACTION: NRS faculty

11. ADVISORY COMMITTEE

During its inception the NRS Program had a very effective Advisory Committee, but over time the role and responsibilities of the committee have been in decline. Comments from Advisory Committee members indicate that no meetings have taken place in over a year, and that, prior to that, when meetings did take place, there were problems of insufficient notice, scheduling, and lack of set agendas and follow-through on recommendations emerging from these meetings. Responses from the survey indicate a need to re-confirm old appointments and make new ones: for example, the Review Committee noted that no student representative was listed on the 2000-2001 membership list.

RECOMMENDATIONS

(a) The Chair, NRS, review the membership of the NRS Advisory Committee and bring it in line with the UCC Advisory Committee regulation R-2013;

(b) the NRS Advisory Committee be convened on a regular basis, at least once a year;

(c) its meetings be scheduled and agendas distributed with at least one month's notice;

(d) every effort be made to facilitate the attendance of members with day-time jobs;

(e) recommendations emerging from the Advisory Committee meetings be followed through and their progress be reported regularly.

ACTION: Chair, NRS

12. EMPLOYMENT PROSPECTS

The projected growth rate for Foresters, Fish and Wildlife Managers and Agronomists in BC to the year 2005 is well below the provincial average growth rate for all occupations. The traditional resource industry has been affected by declining markets, global competition and labour unrest. Governments, which provide the majority of graduate placements, are continually facing financial pressure to downsize, and unfortunately the resource management sector has a much lower priority that heath and education.

Unless the Kyoto agreements are implemented, this decline is likely to continue for some time. But this decline will also bring new challenges and opportunities. Even now there is a fundamental shift occurring between purely traditional government employment and rising private-sector activities, especially in the oil, gas and other energy fields. This will likely cause more growth in private sector research, or in joint projects involving both the private sector and government. This will result in a shift to project based management, especially in contracting and consulting, which will require a slightly different set of skills.

RECOMMENDATION

(a) As the shift to project based management will happen slowly, it will be important for the faculty of the NRS program to continually monitor the career placement of its graduates along with periodic surveys of employers. These actions will ensure that as this employment environment changes the NRS program content and focus can be adjusted.

Although the Advisory Committee can assist, the most beneficial method is perhaps through the NRS alumni. Adding an alumni section to the existing NRS web pages would have many benefits:

1) Assist faculty in keeping touch with the changes in the resource sector.
2) Provide a friendly contact list for new graduates. Current graduates could use the alumni list to get information about potential career paths and for contacts.
3) Provide a single source for possible alumni donations, coop placements, for guest lectures and student mentoring opportunities.
4) If an email list serve was set up, then a periodic newsletter with potential jobs, postgraduate courses, etc. could be easily delivered. Options after graduation could be identified on the web site.
5) A list of alumni and their current employers in a searchable database could be available. It would also help to create an email listserv so any job postings, post graduate certificates, new courses, etc. could be easily distributed to all current students and alumni.
6) Professional Certification requirements are unclear and inconsistent. These should also be placed on the Web site.

ACTION: NRS faculty

13. MARKETING

No marketing plan exists for improving student intake. Reduction in lower level student numbers shows that the profile of the NRS Program must be raised and effectively marketed. In the past this marketing impetus was not as critical since there was little competition, but with the expansion of UBC's Natural Resource Conservation Programs and UNBC's Integrated Resource Management options, competition is intensifying.

Any marketing plan that increases the number of first year applications will allow more selective entry and improve student quality and success rate. At present there is no real coordinated working relationship with local industry and government. There are few bright spots, especially in the research area but no move to sponsorship or a more direct working relationship. Industry partnerships can bring in much need financial resources, enhance the reputation and also provide networking contacts for student employment.

RECOMMENDATIONS

(a) The NRS faculty should work with the Program Advisory Committee, Public Relations, Co-op Program, and Academic Advisors to create a marketing plan designed to increase first and second year applications. Other possible sources of potential students might be government re-training, introduction of postgraduate certificates, and informational campaigns at all schools with resource/forestry technician programs within BC and Alberta.

(b) A major marketing campaign should also be undertaken immediately in Ontario. Over the last four or five years Ontario has gradually phased out its grade 13. In Fall 2001, grade 13 was completely eliminated. This means that there will be a twice as many students applying for post secondary programs. The NRS program along with the rest of UCC could certainly capitalize on this anomaly.

ACTION: NRS faculty

14. LIBRARY RESOURCES

Both students and faculty expressed frustration with the lack of journals in the library. However, the change in relationship between the Library and the instructional departments, signalled by the recent Library Review (1998), may open the door to more faculty input into journal acquisitions.

RECOMMENDATION

(a) NRS faculty are encouraged to be more proactive in spending the $20,896 departmental and Library Campaign funds currently available for the program, $5,750 of which may be allocated to journal acquisition.

ACTION: NRS faculty

15. COOP

Almost 75% of NRS students avail themselves of the program's coop option. The majority sees it as very beneficial in preparing them for the workforce and making contacts in the labour market. Some suggested, however, that the preponderance of coop placements being in the forest sector does not serve the interests of those coop students interested in natural resource management.

RECOMMENDATION

(a) The NRS Coop Coordinator attempt to expand coop job placement opportunities in wildlife and natural resource management.

ACTION: NRS Coop Coordinator

16. CROSSLISTING OF COURSES

Some NRS courses are cross-listed to Biology. These are courses that are taught by NRS faculty but taken by both NRS and Biology students simultaneously. For the NRS student, the course will have an NRSC acronym but for the Biology student the same course will have a Biology acronym. This presents a problem when the institution counts FTE's since the NRS faculty's instructional activity is being under-represented while the Biology faculty's is over-represented.

RECOMMENDATION

(a) The Dean, Sciences, examine the cross-listing of NRS courses to Biology and re-attribute the FTE instructional activity involved to the NRS Program.

ACTION: Dean, Sciences

APPENDIX A
METHODOLOGY

The data were collected in the following ways:

1) Consultation took place with Gary Hunt, Chair, NRS Department; Larry Iles, Coordinator, Co-op Programs; and members of the NRS Department on the design of the questionnaires.

2) Surveys were administered to Natural Resource Science Faculty, current and former students, employers, and Program Advisory Committee members. All data were processed using SPSS to achieve frequency rates and mean responses. Subjective comments for each group were recorded separately and anonymously. Former student data from 1996-2000 iterations of the BC Student Outcomes Surveys were culled from the Student Outcomes Reporting System (SORS) and made available to the Review Committee.

3) Documentation of the NRS program (including course outlines, faculty resumes, etc) were provided to the Review Committee via Dr. Hunt.

4) Data on annual FTE utilization rates, graduation rates, gender distributions, seat utilization rates and grade distributions were provided by the Office of Institutional Research and Planning.

5) The following people associated with the Program were interviewed:

   - Dr. Robert Androkovich, Instructor, Economics
   - Peggy Jo Broad, Lab Demonstrator, NRS
   - Nadine Cornell, Departmental Secretary, NRS
   - Dr. Brian Heise, Associate Professor, NRS
   - Dr. Karl Larsen, Associate Professor, NRS
   - Jacquline Sorenson, Part-time Instructor, NRS
   - Dr. Gordon Tarzwell, Chair, Economics
   - Kent Watson, Assistant Professor, NRS
   - Sheri Watson, Lab Demonstrator, NRS
   - Eight Third and Fourth Year NRS students
   - Two NRS Graduates

APPENDIX B
COMPLETION RATES

Completion rates may be determined by subtracting "fail" (F), "did not complete" (DNC), "withdrew" (W), and "audit" (AUD) from enrollment numbers. Hence, over the period of Fall 1997, Winter 1998, Fall 1998, Winter 1999, Fall 1999, Winter 2000 and Fall 2000 the following completion and attrition rates are found:

	Total Registrants	Total Passes	Total Attrition	% Completion	% Attrition
1ST year courses	655	582	73	89%	11%
2nd year courses	841	794	47	94%	6%
3rd/4th year courses	2249	2091	158	93%	7%
Total	3745	3467	278	93%	7%

Note: Includes distance education courses in passes/enrolment figures. Also, for BNRS courses 99/FA enrolment figures are taken from Colleague, and all other data taken from Stable Enrolments.

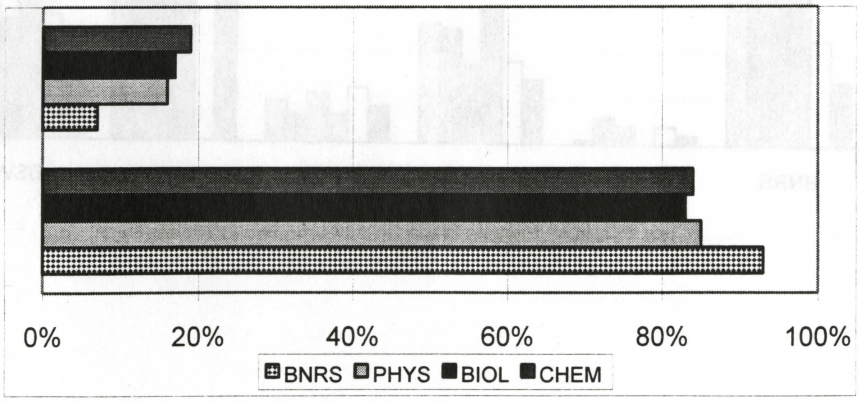
Completion rates compared to other Science disciplines:

Discipline	Total Registrants	Total Passes	Total Attrition	% Completion	% Attrition
NATURAL RESOURCE SCIENCE	3745	3467	278	93%	7%
CHEMISTRY	3857	3228	629	84%	16%
BIOLOGY	7378	6121	1257	83%	17%
PHYSICS	3181	2710	471	85%	15%

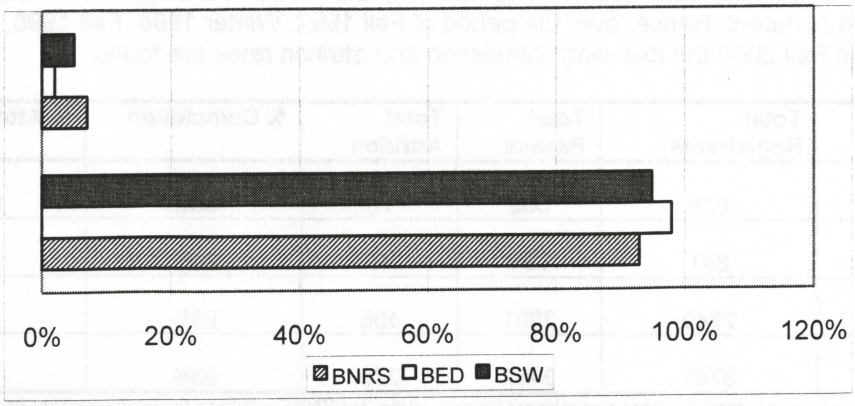
Completion rates compared to other Professional Degree Programs:

Discipline	Total Registrants	Total Passes	Total Attrition	% Completion	% Attrition
NATURAL RESOURCE SCIENCE	3745	3467	278	93%	7%
EDUCATION	3536	3482	54	98%	2%
SOCIAL WORK	2173	2059	114	95%	5%

Comparison of Natural Resource Science Completion and Attrition Rates with Other Science Programs



Comparison of Natural Resource Science Completion and Attrition Rates with Other Professional Programs



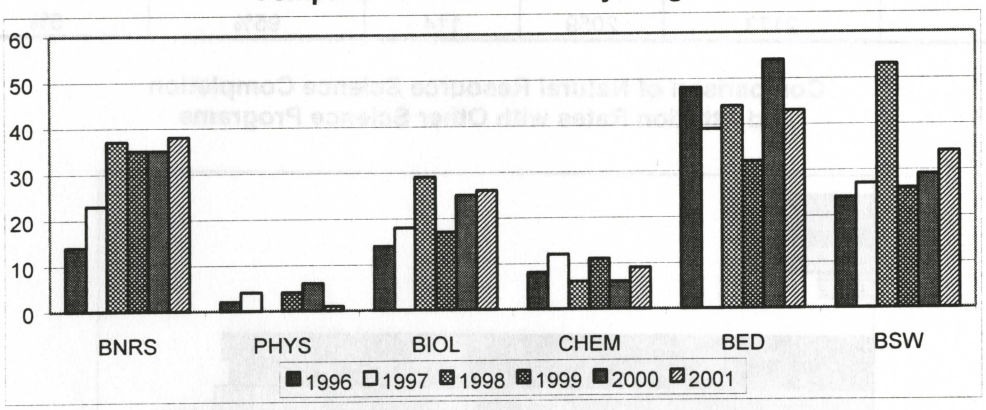
APPENDIX C
GRADUATION HEADCOUNTS

Source: Dean, Sciences, and UCC Convocations Guides 1996-2001.

Graduation numbers from 1996 - 2000 reflect recipients of UCC degrees, UBC degrees in conjunction with UCC degrees, and from 1996 – 1999, UCC degrees in conjunction with UVIC degrees.
The following table reflects the numbers of majors granted by discipline since 1996.

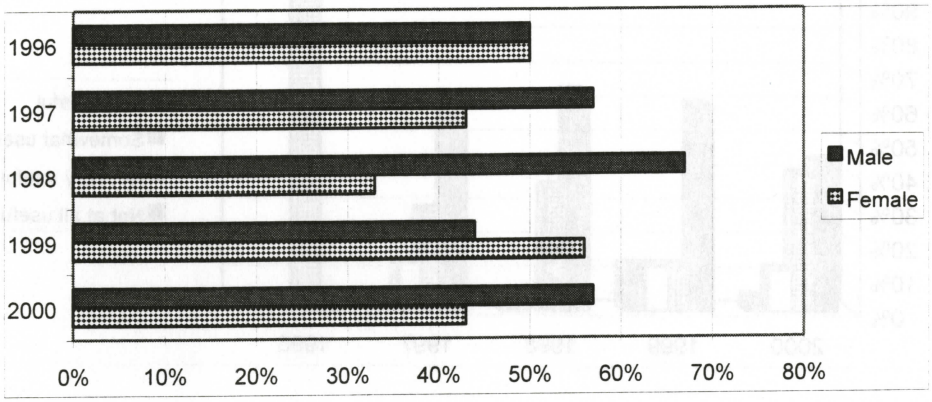
	1996	1997	1998	1999	2000	2001	Total
NATURAL RESOURCE SCIENCE	14	23	37	35	35	38	182
PHYSICS	2	4	0	4	6	1	17
CHEMISTRY	8	12	6	11	6	9	52
BIOLOGY	14	18	29	17	25	26	129
EDUCATION	48	39	44	32	54	43	260
SOCIAL WORK	24	27	53	26	29	34	193

Comparison of Graduates by Program



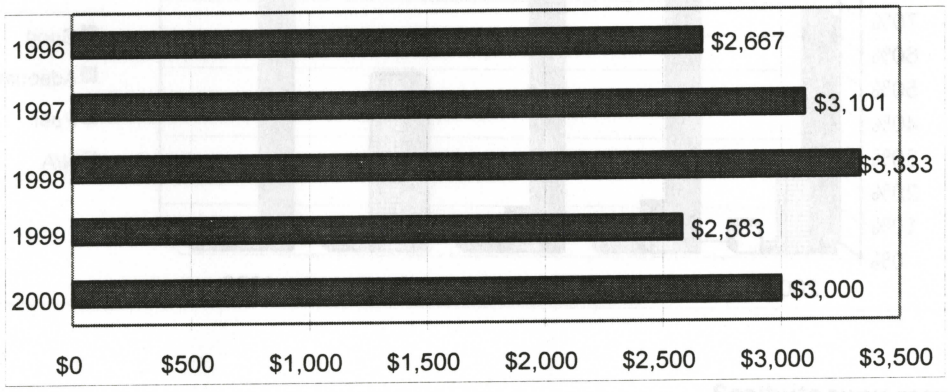
APPENDIX D
GENDER RATIO OF BNRS STUDENTS

Source: SORS 1996-2000 Former Students



APPENDIX E
FORMER STUDENT MEDIAN MONTHLY SALARIES

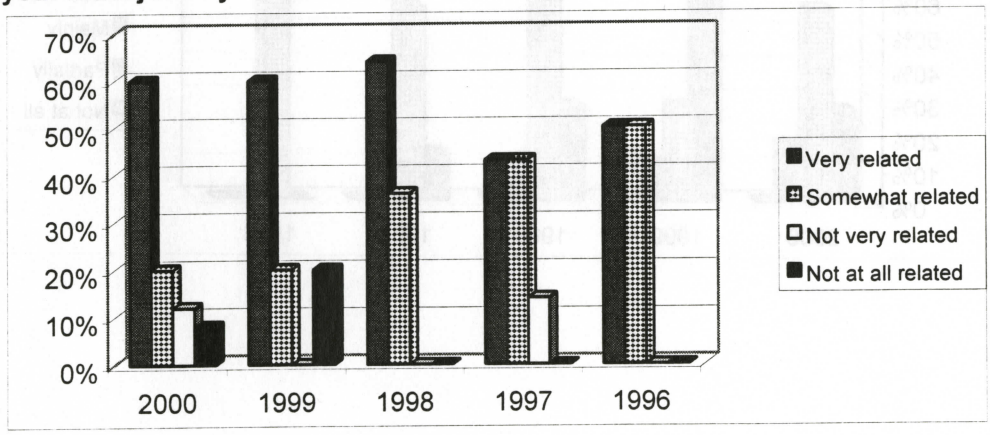
Source: SORS 1996-2000 Former Students



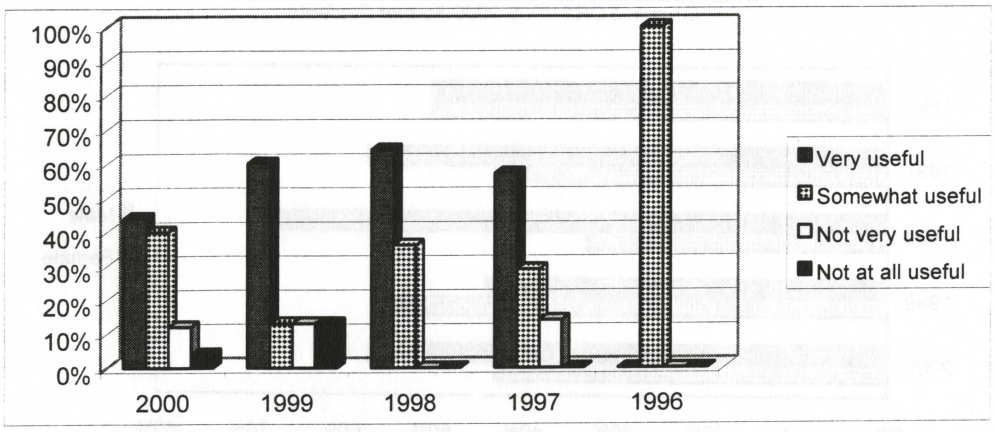
APPENDIX F
EVALUATION OF EDUCATION

Source: SORS 1996-2000 Former Students

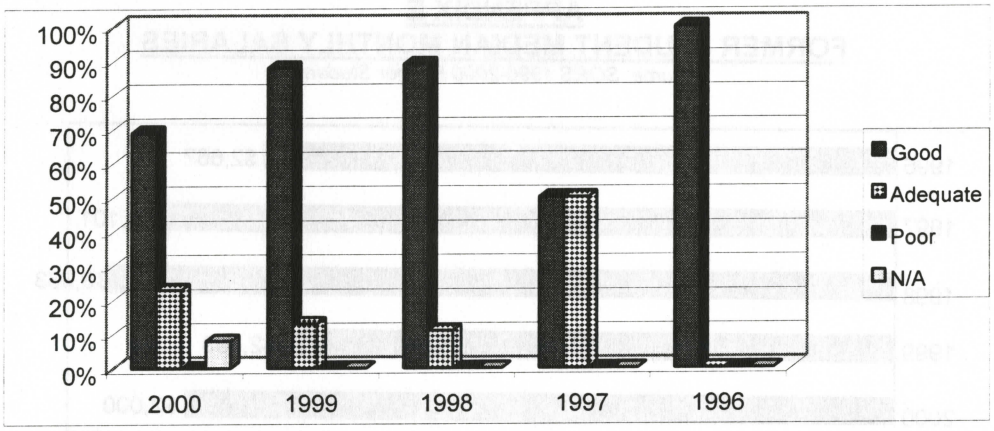
How related is your main job to your studies?



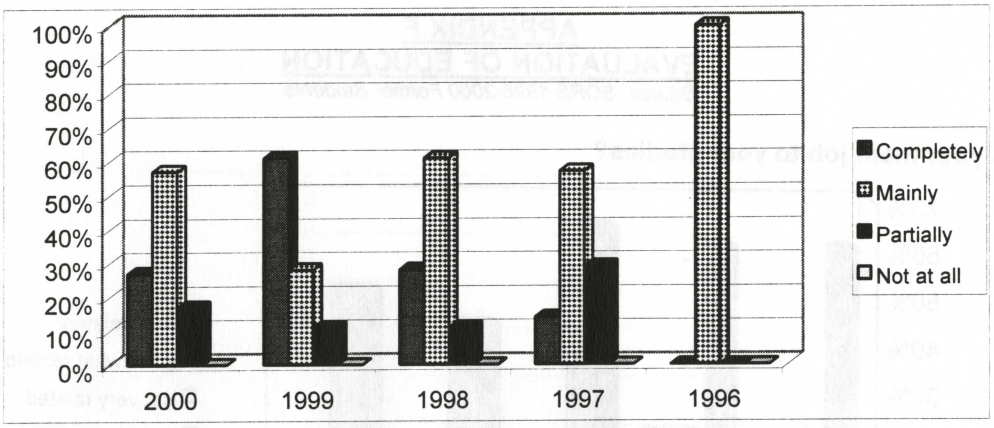
How useful was your training in performing your job?



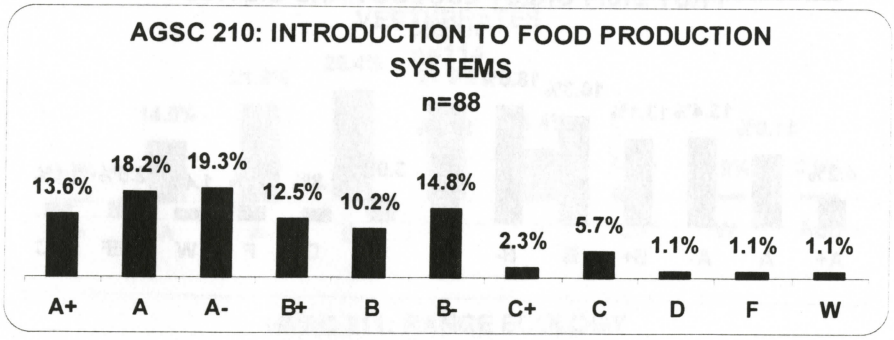
How well organized was your program?

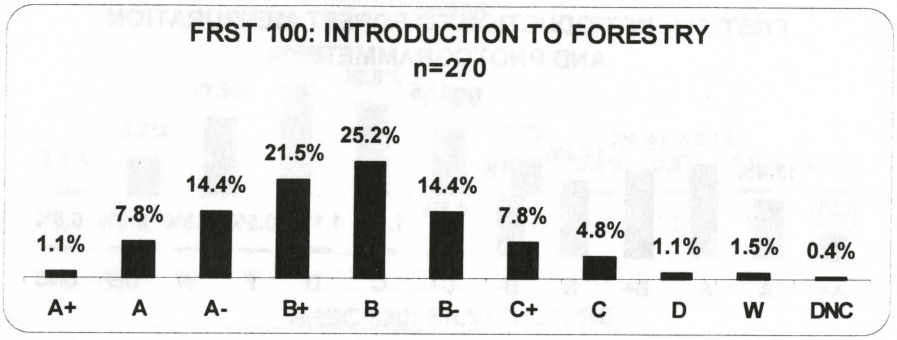


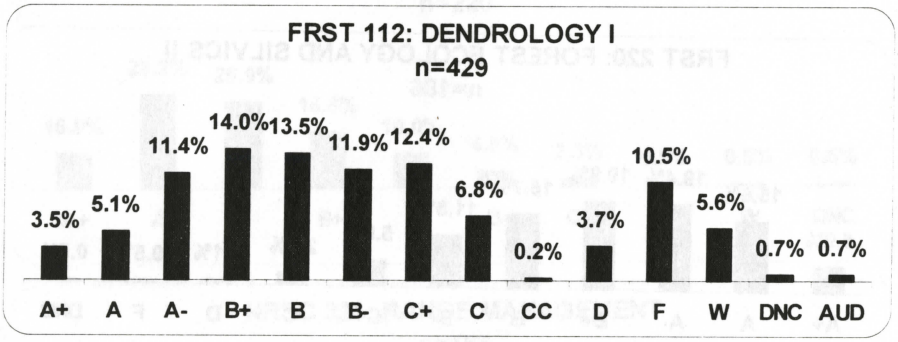
How satisfying were your studies?

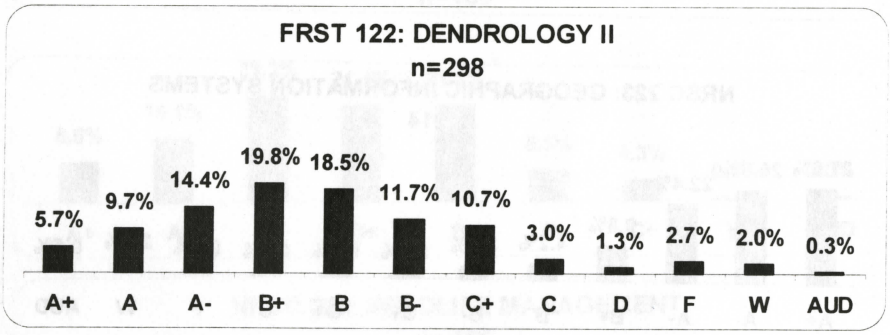


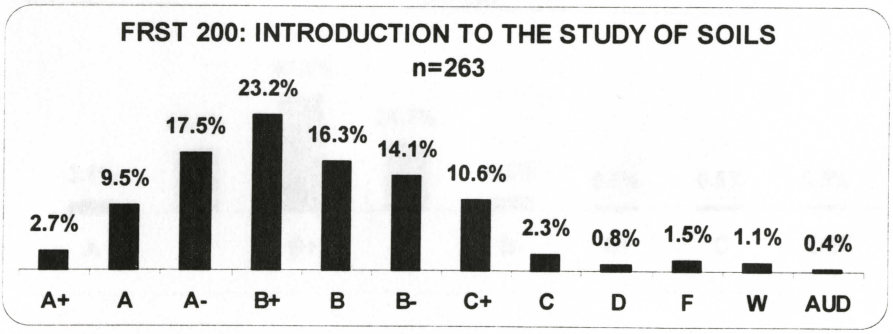
APPENDIX G
GRADE DISTRIBUTIONS 95/FA – 00/FA (LOWER LEVEL)



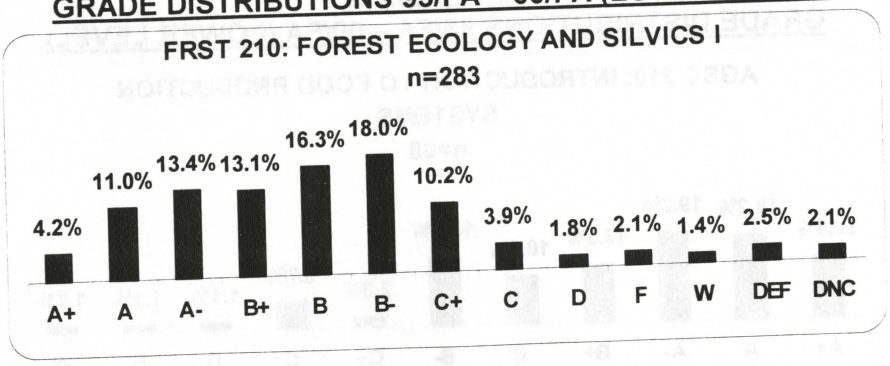


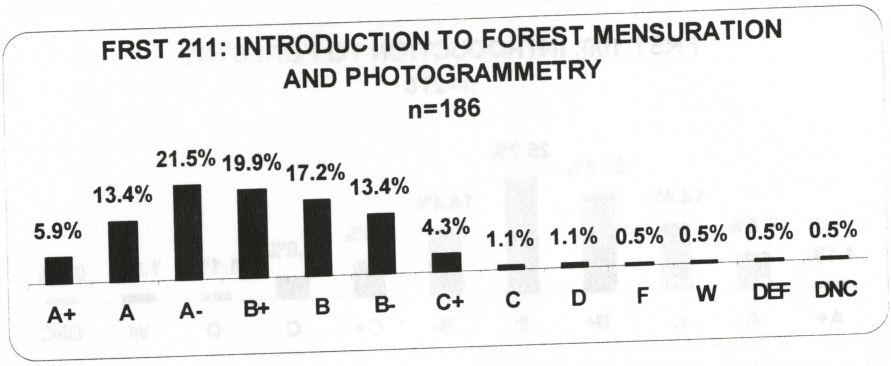


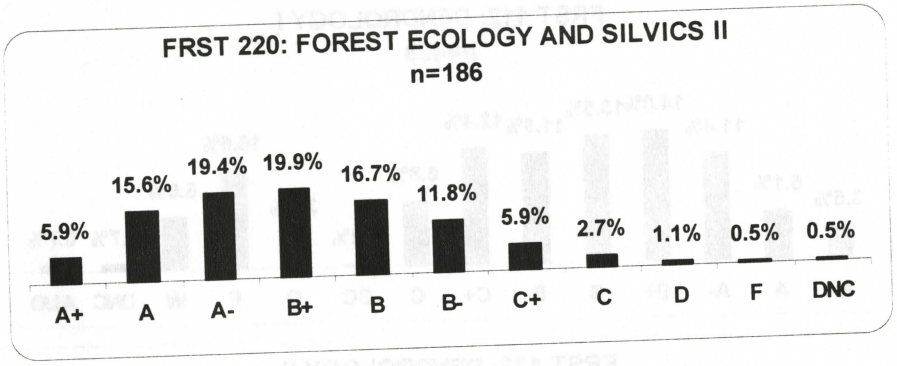


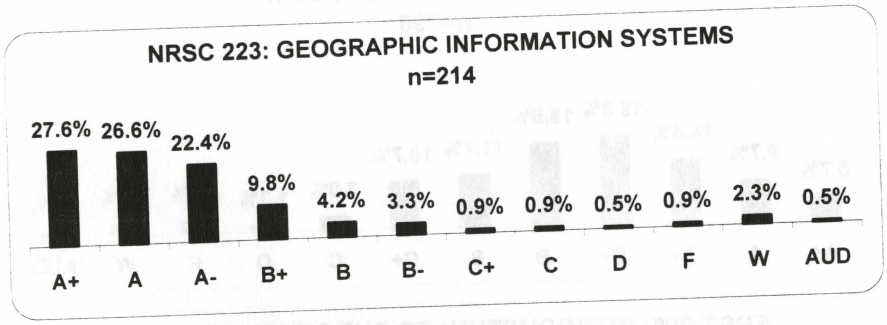


GRADE DISTRIBUTIONS 95/FA – 00/FA (LOWER LEVEL)

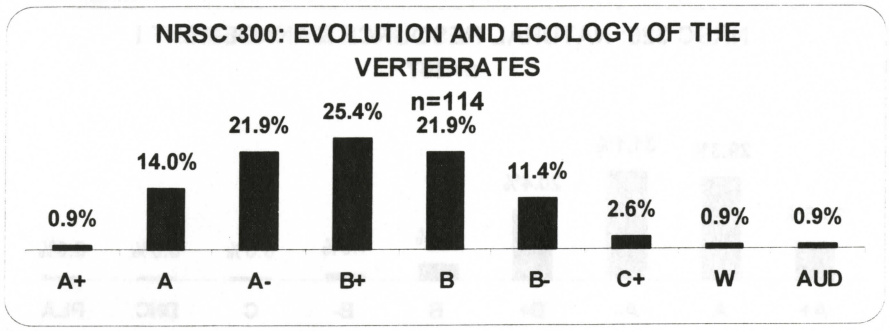


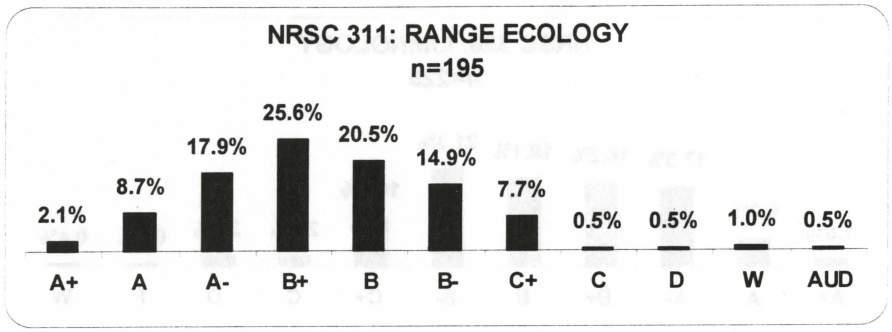


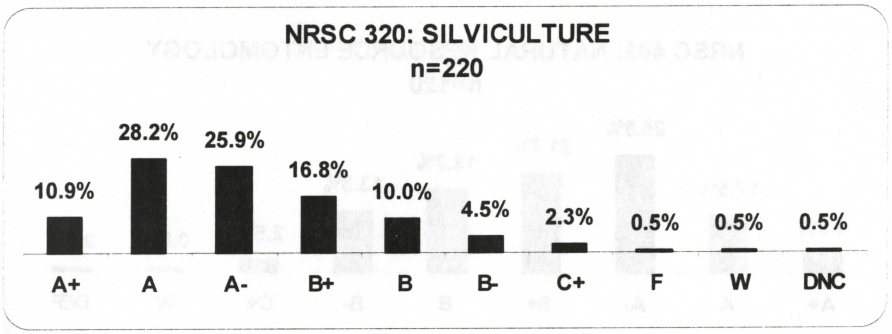


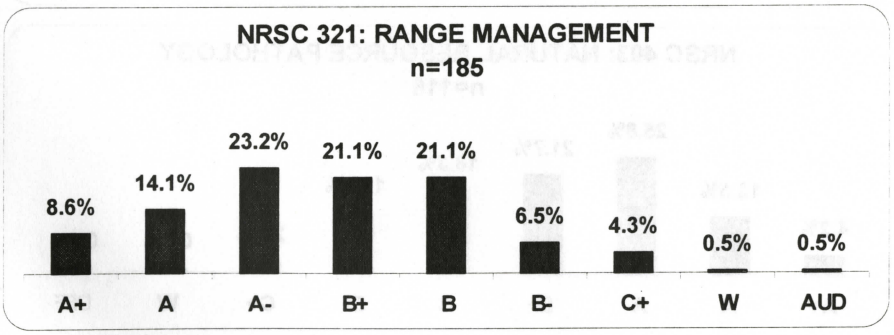


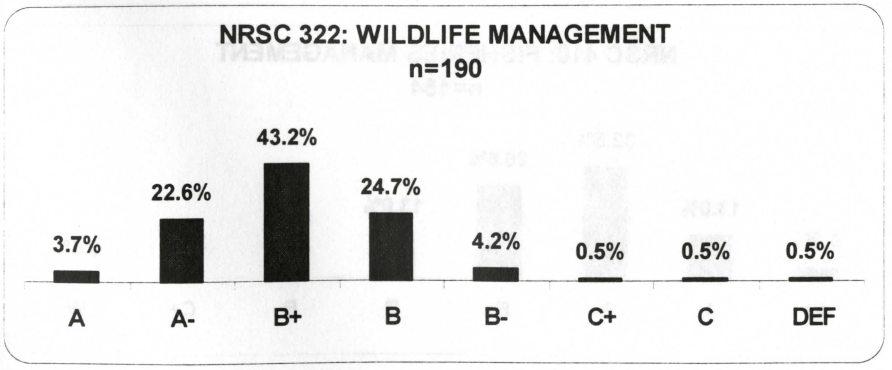
GRADE DISTRIBUTIONS 95/FA – 00/FA (UPPER LEVEL)











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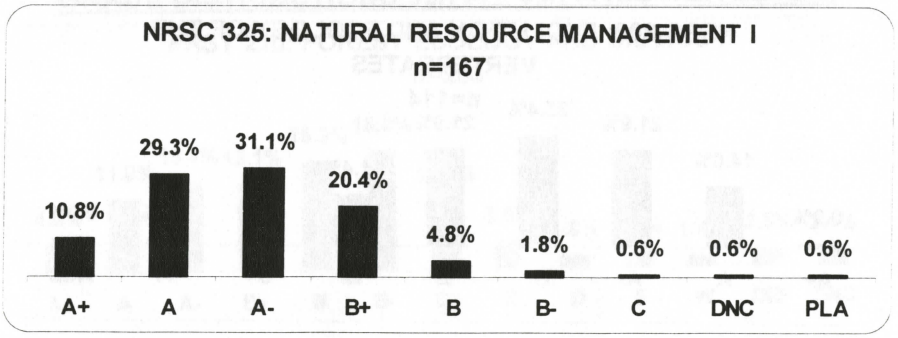

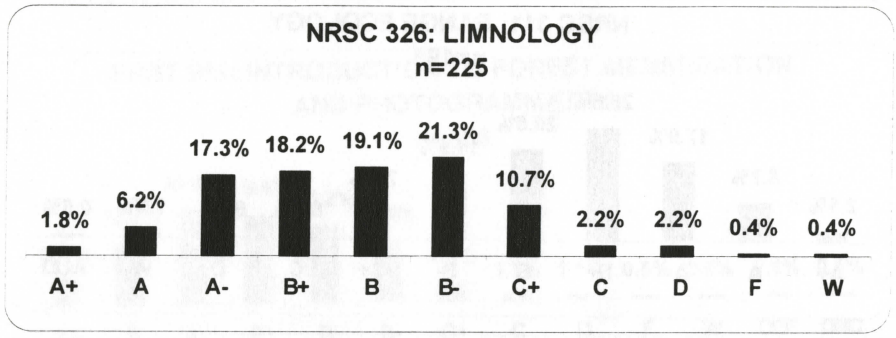

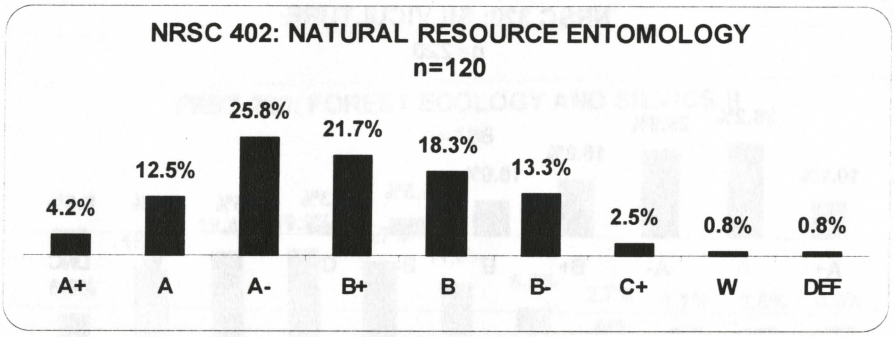

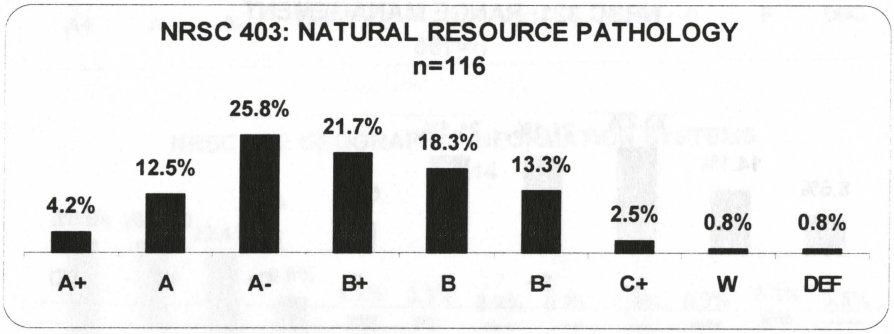

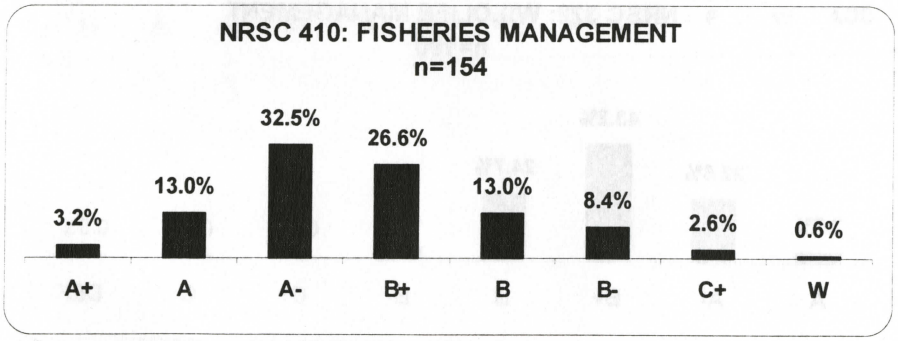

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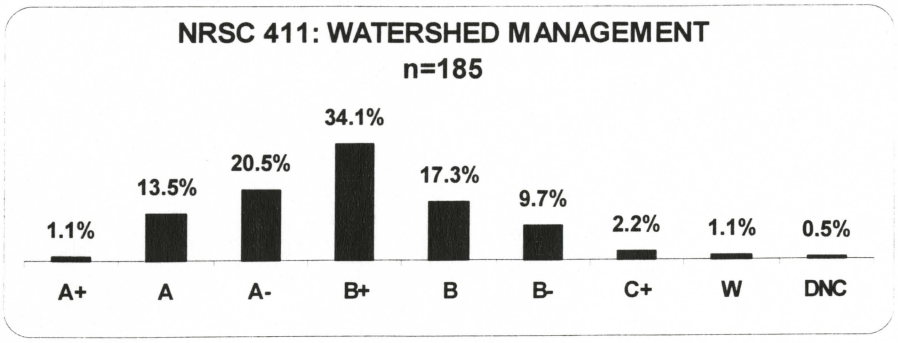

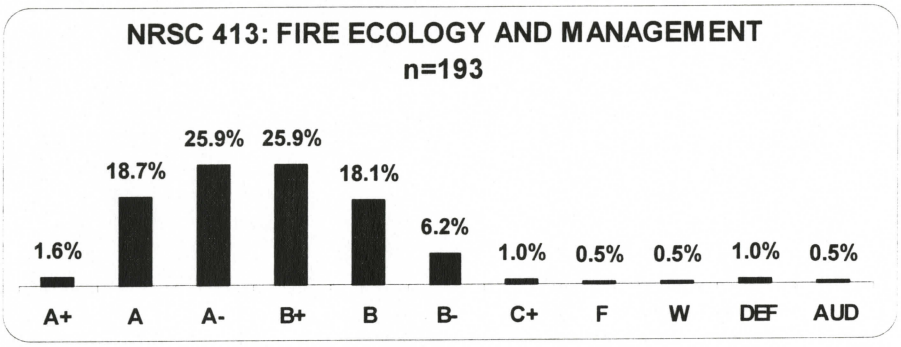

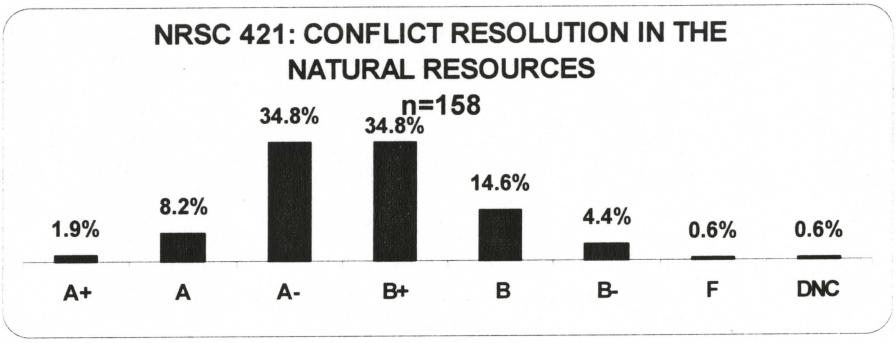

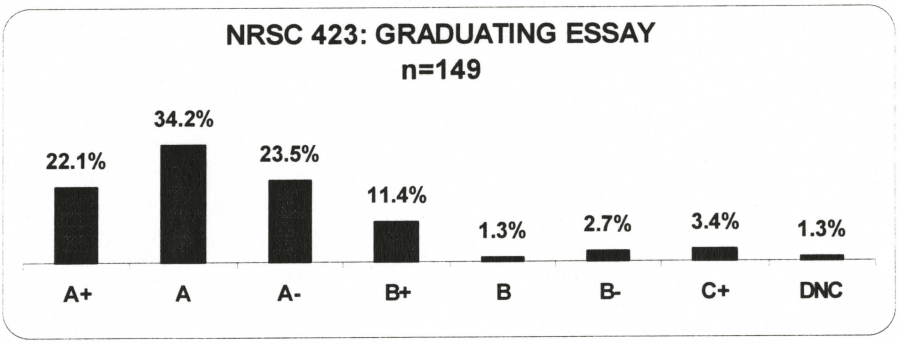

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