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Draft Report

from

**Committee on Coordination of Graduate Education
in Environment and Natural Resources**

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1. Summary

This is a draft report prepared by the Committee on Coordination of Graduate Education in Environment and Natural Resources that was established by the Dean of the Faculty of Graduate Studies (FOGS). Based on its initial discussions the committee has concluded that the rich diversity and unique capabilities of people, programs and units within FOGS, in cooperation with the other UBC faculties, have the potential of building a reputation for UBC as the best place for integrated study of environment and natural resources in North America. However, to make this vision a reality it is necessary to build on strengths, remedy weaknesses, capitalize on opportunities and avoid threats. The committee recommends the adoption of this vision and proposes specific strategies (summarized in Table 3) and a structure for evolving coordination and development. This draft is being distributed for review and comment. We would appreciate receiving your suggestions on how it might be strengthened including correcting errors and filling gaps in information. Please send your comments and suggestions to Professor Tony Dorcey, Resource Management and Environmental Studies (Tel. 822-5725; Fax 737 2167; dorcey @unixg.ubc.ca).

2. Terms of Reference

During the summer of 1995 the Dean of the Faculty of Graduate Studies established a Committee on Coordination of Graduate Education in Environment and Natural Resources with the following terms of reference:

1. To consider existing and proposed graduate courses related to Natural Resources and the Environment in Faculty of Graduate Studies units and to make proposals for their rationalization if there is significant overlap or if they could be presented more coherently.
2. To consider innovative means of cooperation in the teaching and training of graduate students in this general area, with or without further amalgamations.

3. To report back by November 10, 1995. The committee is free to include in the report any other recommendations or observations that seem to be pertinent, for example regarding courses or programs offered outside the Faculty of Graduate Studies or regarding coordination in areas that go beyond graduate education.

3. Committee's Approach

The Committee has met during October and November. The initial strategy for informing our discussion was to identify from the 1995/96 Calendar, the units in the Faculty of Graduate Studies (FOGS) that we believed to be offering graduate programs or conducting research related to this area and to seek from them the information packages that are usually provided to potential students. We also conducted some brief, focused strategic planning efforts to begin to clarify objectives and possible actions to achieve improved coordination and integration of Environment and Natural Resource Studies (ENRS) in FOGS. In view of the short time available for consultation, it was decided that this information, together with the results of other recently completed reports, such as the review of the Faculty of Graduate Studies, should be used in preparing an initial report that would then be circulated to all units for review and comment. Following this, the assessment and recommendations would be revised in response to the feedback received and the report submitted to the Dean.

In responding to its terms of reference, the committee considered that coordination of graduate education in Environment and Natural Resources presented potential opportunities for improvements in graduate education and cost-effectiveness of program delivery. This in turn would lead to improving the quality of graduates and make better use of limited resources. The committee adopted the following more specific objective: to make recommendations that result in

- (i) improved graduate education (teaching, administration, resources)
- (ii) improved cost-effectiveness, and
- (iii) time savings.

While this report focuses on the units in the FOGS, the committee recognizes that it is also essential to consider other faculties and their units because of the extent to which they depend on each other for degrees, courses and research in the area of environment and natural resources studies at the graduate level.

4. Environment and Natural Resources Research and Teaching Programs in FOGS

The FOGS programs and units that we have identified are listed with some summary information in Tables 1 and 2. Table 1 lists existing graduate programs in the area of environment and natural resources in the FOGS and summarizes information about the degree programs that they offer. Table 2 lists the research centres and institutes in the FOGS that are conducting studies in the area of environment and natural resources and indicates the graduate programs in which students conducting research with faculty in the unit have recently been registered.

Table 1
Existing Programs of Units in the Faculty of Graduate Studies
Involved in Environment and Natural Resource Studies

PROGRAM	MASTERS	PH.D	COURSES	STUDENTS *Ma/PhD*
Interdisciplinary Studies (IS)	MA, MSc	Yes	No	?
Interdisciplinary Hydrology (IH)	No	Yes	No	?
Occupational Hygiene	MSc, 45cr: 12cr thesis; 6cr project	Yes	9+	20/1
RMES	MA, MSc, 36cr 12cr thesis	Yes	3+	26/29
SCARP	MA, MSc, 60cr 12cr thesis	Yes	40+	102/27

Table 2
Research Centres and Institutes in the Faculty of Graduate Studies
Involved in Environment and Natural Resource Studies

UNIT	GRADUATE DEGREE PROGRAMS	STUDENTS *Ma/PhD*
Applied Ethics*	IS, Philosophy, Education, Nursing	5/5
Applied Math.*	Mathematics, Economics, Geography, Geophysics, Engineering, Commerce	26/9
Asian Research	(no graduate students)	
CHS	(all included in SCARP)	
Fisheries	RMES, Zoology, Economics, SCARP	7/10
Health Promotion	IS	0/10
International Rel*	Political Science	6/4
MAGIC*	Computer Sc., Education, Oceanography	15/15
SDRI	RMES, Engineering	4/1
Transportation	Commerce, SCARP, Engineering	0/0
Westwater	RMES, SCARP, Zoology, Oceanography Civil Eng., Soil Science	42/10
Women's Studies & Gender Rels	IS	0/0

** Numbers of students are approximations for recent years and may not all be reported on the same basis (e.g. some units may only report primary supervisors while others include committee members). Question marks (?) indicate where help is needed in developing reasonable estimates. Also note that asterisked units would only have some percentage (generally less than half) of their students doing theses in ENR fields.

Certain patterns emerge from the tables, SCARP has by far the largest program, although the majority of their students would likely say their major concentration is in urban or international or design oriented areas. RMES has a substantial number of students and few courses. Several units (e.g. Fisheries Centre) have students associated with them who are registered in various programs.

The University of British Columbia has long had particular strengths in the general area of environmental and natural resources and in recent years there has been a great deal of innovation in graduate education and associated research activities in these areas. Three general points should be noted:

- (i) Long established programs have adapted to new opportunities. For example, the School of Community and Regional Planning (SCARP) added faculty and courses to establish a major new stream focusing on international studies; and Resource Management and Environmental Studies (RMES) evolved to become a formal program and was strengthened by amalgamation with the Westwater Research Centre.
- (ii) A substantial number of new programs and units have been established in recent years. For example, the Graduate Program in Occupational Hygiene, the Sustainable Development Research Institute, the Fisheries Centre, and the Centre for Applied Ethics are all newly formed since 1991 and each is contributing to graduate training and research.
- (iii) Beyond these units in the Faculty of Graduate Studies, other faculties have been innovating. For example, the Faculty of Forestry has introduced the Centre for Applied Conservation Biology and the Department of Civil Engineering has substantially expanded its graduate program in Environmental Engineering.

This remarkable period of growth and innovation is in large part a response to the expansion and diversification of research funding and demands for graduate education in environment and natural resources in the post Brundtland years. Expansion in the area of environment and natural resources is a substantial component of the overall doubling over the last 15 years in the graduate student enrollment, to the 6,446 total for 1994 reported in the FOGS Review.

5. Strengths, Weaknesses, Opportunities and Threats

In identifying and discussing the issues relating to ENR teaching and research in the FOGS, the committee drew upon several recent reports, including:

- Workshop on the Integration of Focus and Activities of Units in the Faculty of Graduate Studies, 24th October, 1994.
- Review of the Faculty of Graduate Studies, April 1995
- Graduate Student Experiences at U.B.C.: An Assessment, September 1995
- Matrix of Necessary and Desirable Elements in Graduate Programs, Draft#5

Drawing on these reports and experiences of members of the committee, the following general strengths, weaknesses, opportunities and threats were identified as being particularly relevant to our terms of reference. They are examined more specifically in following sections.

Strengths

- Diversity and reputation of its faculty and research teams.
- Experience in interdisciplinary research and graduate training.
- Interdisciplinary graduate program capabilities within FOGS.
- Cross-fertilization of theoretical and applied research and training for academic and professional careers.
- Flexibility for interdisciplinary innovation in teaching, training and research.
- Collaboration with communities around the world and organizations from the local to the global.

Weaknesses

- Hard money funding for units and programs has not kept pace with expansion in student enrollment and levels of research.
- Financial support for graduate students doesn't meet needs.
- Increasing reliance on soft money for continuing activities.
- Weaknesses in coordination of information and development.
- Lack of strategic planning.
- Inadequate space and administrative resources.
- Inadequate computer communications systems.
- Diffuse programs with little coordination or joint curricula.
- Potential for redundant programs or courses.

Opportunities

- The cutting edge is interdisciplinary research and graduate training.
- Immense growth in demands to meet the research and training needs of communities and organizations from the local to the international.
- Emerging demands for new types of graduates.
- Diversifying demands from graduate students.
- Demands for new types of degrees.
- Build on capabilities to become a major university presence in this area.

Threats

- The immediate outlook is for a period of increasing restraint in university and research funding.
- Ad hoc responses to budget crises that could occur in the absence of more coordination and planning.
- Growth in competing programs.
- Declining ability to fund high quality applicants.
- Changing employment opportunities.
- Changing needs of employers, meaning our "standard" student "products" could be ill-equipped or under-trained.

6. A Vision to Pursue

Based on its consideration of these strengths, weaknesses, opportunities and threats the committee has reached two broad conclusions and recommendations:

- (i) The rich diversity and unique capabilities of people, programs and units within the FOGS, in cooperation with the other UBC faculties, have the potential of building a reputation for UBC as the best place for integrated graduate study of environment and natural resources in North America. We make this statement based on our impressions of the quality and diversity of faculty in this university compared to places like environmental and resource programs at UC Berkeley, Yale, Michigan, and others.

RECOMMENDATION: DEVELOP A COMMITMENT TO THIS VISION

- (ii) Given the weaknesses in the present delivery of graduate education in the area of environment and natural resources and the prospect of severe restraint in the immediate period ahead, there is an urgent need to coordinate and develop strategies within FOGS, in collaboration with other UBC faculties, for building on strengths, remedying weaknesses, exploiting opportunities and avoiding threats.

RECOMMENDATION: IMPLEMENT A STRATEGIC PLANNING PROCESS

In the following sections these general conclusions and recommendations are developed in more detail. In the next section, we examine various specific actions that might address particular issues. This reveals the systemic nature of the issues and the responses required to them. In Section 8 we discuss various systemic strategies that could be pursued to further the process of coordination and integration. In essence, the strategies comprise different levels of “intervention” for the various actions outlined in Section 7. In the

concluding section, we examine alternative structures for developing and implementing the strategies in the near and longer term.

7. Specific Issues and Actions

If we want to pursue a vision of making UBC the best place for integrated graduate study of environment and natural resources in North America then we need to address a number of issues that fall into three areas:

- (i) improving information about ENR studies,
- (ii) enhancing coordination and development of ENR studies, and
- (iii) strengthening recruitment, admissions and job placement for ENR students.

In Figure 1 [to come], we illustrate how pursuit of the vision is dependent on addressing a variety of specific issues. It also shows how the issues and responses to them are inter-related. Table 3 summarizes the specific issues along with potential responses, listed by increasing levels of intensity. In the subsections that follow we briefly amplify the table by first stating the nature of the issue and then indicating potential actions that respond to it. Examples are included to make ideas more concrete and to demonstrate what is already ongoing in some units or programs.

Table 3.
Issues and Actions

Issues	Potential Actions
7.1 Information Availability	<ul style="list-style-type: none"> • Revise UBC Calendar* • Develop brochure on program* • Develop home page on WWW*
7.2 Coordination/Development Curriculum and program reviews	<ul style="list-style-type: none"> • Give notice of intent* • Coordinate and influence** • Foster reviews and rationalizations***

Cross-listing and addition/deletion of courses

- Compile a list of existing cross-listings*
- Coordinate the addition and deletion of courses and cross-listings**

New programs and degrees

- Exploit committee degree options*
- Develop special concentrations within existing programs**
- Encourage joint degree options***
- Develop certificate/diploma programs***

Internship and coop programs

- Identify existing internship and coop programs on campus*
- Develop an applied project course(s)**

7.3 Recruitment/Job Placement

Recruiting and admissions

- Develop an integrated recruitment and admissions strategy*

Graduate student financing

- Compile information and guidance on financial assistance options*
- Facilitate applications for funding*
- Actively coordinate and seek funding**

Job placement

- A graduate student initiative**
- A mentoring program**

7.1 Improving Information on ENR Studies

7.1.1 Information on existing courses and programs

In starting its work, the committee members experienced what it is like for a student or outsider to try and find out who is doing what at UBC in the area of graduate studies relating to environment and natural resources. To say the least, it is not easy. Once discovered, the offerings of programs and courses are

remarkably rich and incredibly diverse. However, beyond what is available in the UBC Calendar, information about them is widely scattered, uneven in its coverage and often not current. This has implications for faculty and current students who wish to collaborate on environmental or natural resources research as well as for the recruitment of new graduate students. There is also a sense among faculty that better students could be recruited to UBC if there was coordination of existing programs in these topic areas. Similarly, current students are often unaware of complementary programs/courses in other units/departments since no general information exists for ENR studies at UBC. Prospective students wishing to pursue graduate studies in ENR at UBC must go through the Calendar page by page to locate specific departmental programs and then contact the potentially interesting candidates one by one.

Action options

- (i) Revise the UBC Calendar: A minimal goal would be to improve the Calendar entry to include a heading for Environment and Natural Resource Studies which then refers to the overall FOGS capability in this area and to the specific units with graduate training/research programs.
- (ii) Develop a brochure: A further goal would be the development of an information document on "Environment and Natural Resource Studies at UBC." Such a document would enable faculty and current students to learn about what is happening across the campus in this area. A coordinated document would help FOGS as well as individual units to direct students towards more appropriate programs or to develop interdisciplinary programs. It would also be valuable to incoming graduate students and in recruiting new students (more below).
- (iii) Develop a home page on the WWW: A natural extension of such a document would be the development of an Environment and Natural Resource Studies home page on the WWW. This page would be listed/linked on the UBC and FOGS home pages as initial points of reference with upward links from individual department/centre home pages. In this fashion, students who are looking for appropriate programs at UBC would be directed to the ENR studies page or students who initially contact a particular unit's page would see that there are other potentially relevant programs at UBC. In addition, the decentralized approach of linked home pages allows units and individual faculty to retain control over information and thus ensure its currency. The hierarchical approach also permits those enquiring to customize their selection of increasingly specific and detailed information. For an example, visit [http://\(?SCARP under construction\)](http://(?SCARP under construction))

7.2 Enhancing Coordination and Development of ENR Studies

7.2.1 Curriculum and program reviews

At any point in time, there are various curriculum or program reviews underway. For example, at the present time SCARP is in the midst of revising its curriculum in significant ways and this process is expected to continue. Such activity can be anticipated to intensify as units respond to the rapid evolution of knowledge in ENR fields, changing demands from students and potential employers, and exigencies of financial cutbacks. The accelerating interest in developing increasingly interdisciplinary ENR studies is giving a unique momentum to change and innovation in curriculums and programs. Two indications of this are the emergence of novel courses (e.g. RMES 500B Watershed Management) and diversity of interdisciplinary thesis research spawned among a bewildering array of programs by the EcoResearch Project (visit <http://web.ucs.ubc.ca/ire/ecoresearch>).

The rapidity and extent of changes underway present both problems and opportunities. For students who are applying for admission or entering their first year, it introduces substantial uncertainty about the course offerings that they can expect to draw on during their residency. For faculty who are advising students about opportunities outside of their own unit or program, it creates major challenges to being well-informed. At the same time, the fact that curriculum development is underway provides potential opportunities for cooperation and integration across programs and units but this is very difficult to exploit when there is little knowledge of what others are doing.

Action options:

- (i) Give notice of intent: In a number of simple ways, notice can be given to all potentially interested parties about ongoing review and development of curriculum and programs. A general advisement to expect ongoing change could be included in the FOGS section of the UBC Calendar and particular units could include relevant specifics within their item. Appropriately presented, this could convey an impression of vitality and dynamism. More specific information could be included in each unit's materials and kept current on its home page. In addition, a forward looking section could be added to each unit's annual report to the Dean, thus making the documents more valuable. They also could be posted on the unit's home page so that there is much greater and more immediate pay-off to all the efforts that go into preparing them.
- (ii) Coordinate and influence: More could be gained from ongoing reviews and developments by facilitating coordination among them and influencing their content. Given that people are informed about intentions, as described above, it would be a comparatively simple matter to create a

mechanism for stimulating coordination between units and programs so as to give consideration to creating greater synergy and avoidance of redundancy in offerings. For example, what issues should be considered by SCARP as it reviews its curriculum in light of the recent establishment of the Resources Management and Environmental Studies Program and RMES's newly emerging curriculum? Possible mechanisms or structures for performing this function are considered in Section 9.

- (iii) Foster reviews and consideration of rationalizations: Given the rapidity and diversity of change both internally and externally there may well be unrecognized opportunities (and threats) unless there is an incentive and mechanism for identifying possibilities. The recent amalgamation of Westwater and RMES was stimulated in large part by the Dean focusing discussions among all FOGS units on potential opportunities for gain and demonstrates what might be possible (see Section 9 for possible mechanisms and structures).

7.2.2 Cross-listing and addition/deletion of courses

A number of courses are cross-listed in various ways. These may be courses that are offered by one unit and are required or strongly recommended as part of a program outside of that unit. For example, Plan 595 is a required/recommended course for students registered in RMES and is regularly taken by students in Engineering. Likewise, some programs in FOGS regularly draw on courses outside of the Faculty (e.g. Soils 517). Such an arrangement can be a highly efficient and productive way of providing courses where otherwise numbers might not be adequate to permit offering the course or programs would have to develop the course for themselves. Faculty and students report that such courses provide unique opportunities for students from different disciplines to interact and engage in interdisciplinary studies.

Problems can arise, however, when such courses become so popular that numbers detract from the graduate learning experience or make productive seminar discussion impossible. For example, students in SCARP have expressed this concern in recent years as the numbers in some graduate seminar classes have increased to around 30 students with at least half of those students coming from programs outside of the School.

Under the present system a unit that offers courses that service other programs does not get any credit for this unless it is able to negotiate compensation from the unit being serviced (e.g. paying for a portion of the cost of delivering the course). This approach becomes very difficult if there are many units/programs involved. It has not been a significant issue during times of less constrained resources and when there were not such high demands for particular courses that could be valuable to a variety of graduate ENR programs. However, in the future, this issue will become much more significant as budgets shrink and units are forced

to consider economizing on their course offerings. At the same time, the anticipated growth in demands for interdisciplinary studies is likely to mean even greater demands for such courses.

Action options:

- (i) Compile a list of existing cross-listings: This information can be readily developed and maintained if each unit/program establishes its own home page and provides on it the basic information for its course offerings. It would provide valuable information for faculty and students about existing options, indicate the extent of existing collaboration, assist in fostering better collaborative teaching between units, and provide essential information for making difficult decisions on priorities, as discussed below.
- (ii) Coordinate the addition and deletion of courses and cross-listings: Anticipating an increasing necessity to set priorities at a time when resources are declining and demands increasing, there is a need to coordinate decisions about adding or deleting courses among the widening diversity of potential interests. Suggestions for new courses need to be widely publicized and input sought from professionals and professional associations outside the university. This is particularly important in designing new courses, aimed at filling priority gaps. An effort needs to be made to discourage redundant courses, pool resources for joint offerings, and encourage cross-listing of courses within the faculty and between faculties. Exciting opportunities exist for different units to sponsor and teach joint courses involving more than one unit. Discussions can take place to improve, alter or combine courses that cover similar or overlapping topics, which would be greatly facilitated by the course information being available on the WWW, as suggested above. Possible mechanisms for such coordination are suggested below.

7.2.3 New programs and degrees

Interest in developing new programs and degrees in the area of environment and natural resources is expected to continue and likely increase. This will be driven by faculty interested in providing new interdisciplinary studies options and students and potential employers demanding new interdisciplinary skills, knowledge and attitudes. Recent examples of this have been the growth in the numbers and diversity of students seeking admission to programs such as RMES and the current proposals for new degree programs in fisheries management and environmental economics. However, making decisions on new programs or degrees will become more challenging in a climate of increasing restraint. On the one hand, there will be greater caution in making new commitments and, on the other hand, there will be greater urgency to stimulate and respond to new demands.

Action options:

- (i) Exploit committee degree options: The existing opportunities for offering novel programs of study through RMES and its use of committee degrees for interdisciplinary studies in environment and natural resources is highly flexible. It is also a most cost-effective means for innovating and piloting options, which can be exploited until such time as there is a demonstrable argument to consider more substantial or formal commitment of resources or distinct recognition as a program/degree. However, the productivity of this approach depends on the willingness of faculty to serve on students' advisory committees and so it is essential to develop much better procedures for crediting faculty for their services on these committees. The administrator responsible for a committee degree program could be required to report on an annual basis to the Dean and the heads of contributing departments on faculty involvement in delivering their program (e.g. see annual report from RMES 1994-95).
- (ii) Develop special concentrations within existing programs: SCARP, for example, offers a concentration in environment and natural resources planning within its masters program options. A similar approach could be taken in other programs so as to give greater focus and recognition to specific concentrations. For example, RMES could develop concentrations in areas such as water management, energy policy, fisheries management, environmental economics, and institutional restructuring for sustainability. Courses for supporting such program options might consist of core offerings through RMES or another unit and concentration specific courses drawn from various specific units.
- (iii) Encourage joint degree options: At other universities joint degrees provide options that allow a student to integrate studies in two major areas of environment and natural resources (e.g. fisheries and planning, soils and economics, environmental engineering and law). The idea of joint degrees could be encouraged and programs at other universities examined to develop general guidelines for joint degree options in the area of environment and natural resources.
- (iv) Develop certificate/diploma programs: There are a number of certificate/diploma programs currently being offered that meet specific market needs in the area of environment and natural resources (e.g. Site Planning). More emphasis could be placed on the development of certificate/diploma programs at the graduate level for professionals that are seeking to upgrade their skills or enrich their exposure to multi-disciplinary approaches. A workshop could be organized with key professional organizations (e.g. Planning Institute of BC, Professional Engineers, Professional Biologists etc) and key major employers (e.g. BC Ministry of Environment, Fisheries and Oceans Canada etc) in the area of environment and natural resources to explore their needs for such programs and indicate what FOGS units might offer.

7.2.4 Internships and cooperative programs

Currently various forms of internship or coop programs relating to environment and natural resources exist in FOGS and other faculties. In FOGS, for example, the Occupational Hygiene Program offers a summer work placement to students who are paid and receive credit. Faculty coordinate the placement of students in public or private sector positions, although students are also encouraged to develop their own placement with an outside partner. SCARP offers an internship program where students spend several hours per week during the academic term working in the public or private sector. Students receive credit through a directed studies course and may receive a stipend from the organization involved. There is increasing interest in such programs by both students and potential employers, particularly in the area of environment and natural resources. However, such programs require very careful planning and considerable time and effort from faculty in their development and operation.

Action options:

- (i) Identify existing internship and coop programs on campus: There is presently little information available about the design of and experience with development and operation of internship and coop programs on the campus. It would be useful to organize a workshop to present information and identify opportunities for further development within the units and programs involved in the area of environment and natural resources.

- (ii) An interdisciplinary applied project course(s): A reasonable goal which could be achieved without substantial additional resources would be an interdisciplinary applied project course. Many opportunities exist for graduate students to work together as an interdisciplinary team devoted to a particular topic area suggested from inside or outside the university community. Outside groups (the GVRD, for example) could be asked each year to suggest possible topics, from which a single project would be selected. On-campus initiatives such as the Greening the Campus program could also be the focus of this interdisciplinary course. Under faculty supervision students would devote an entire academic year to analysing an issue and producing recommendations. This model is similar to an existing Occupational Hygiene course which entails a student-run /faculty-supervised evaluation of a particular problem suggested by a local employer. The recent Landscape Architecture / Planning charette for Surrey is another example of an applied student project. In this type of arrangement, students gain real-world expertise and learn to work directly with other students from different areas of expertise. The ability to contribute as part of a multidisciplinary team is a critical skill for students pursuing careers in environment and natural resources. The outside group which proposes the research topic benefits from the combined efforts of a team of

students working under faculty supervision on a topic of immediate interest. Students from all departments (both within and outside of FOGS) would contribute to the project team. A new topic would be selected each year and Faculty supervision could be rotated yearly and spread among several (2-3) faculty members each year along with the coordination of a senior graduate student.

7.3 Strengthening Recruitment, Admissions and Job Placement

7.3.1 Recruiting and admissions

In recent years there has been strong growth in enquiries, applications and admissions in the area of environment and natural resources. Relatively little effort has been going into recruitment because to date it has seemed unnecessary. However, there are three concerns that suggest this passive approach is going to be increasingly inadequate. Firstly, some faculty believe that stronger applicants could be attracted to UBC if there would be a concerted effort to target applications from those who might be interested in the unique strengths of the FOGS offerings. Secondly, there was a fall-off in applications and admissions in some programs last year (e.g. SCARP), which may presage more difficulty in attracting students in times of increasing fees, greater direct and opportunity costs, and lack of summer and part-time employment. Thirdly, the competition from programs in BC and elsewhere is increasing (e.g. SFU, UVic, UNBC) and some students, who might in the past have been interested in traditional master's programs, are now beginning to consider programs that are more focused on meeting employer demands for specific technical skills (e.g. BCIT).

Discussions with potential and actual applicants and students after they arrive on campus, suggest that the admissions process is not easy for those who might be interested in considering a variety of the ENR studies options (i.e. we are not speaking here about the student who is only interested in a specific option such as planning or occupational hygiene).

Action options:

- (i) Develop an integrated recruitment and admissions strategy: Many of the actions recommended in other sections will assist in remedying the weaknesses in current recruitment and admissions procedures. A workshop could be held which would bring together representatives from each of the units/programs to focus on their recent experiences and the development of integrated strategies for recruiting and coordinating admissions (see discussion below of options for an ongoing coordinating mechanism). In future, annual reports from units/programs could include summaries of the strategies employed and results achieved.

7.3.2 Graduate student financial support

The availability of financial support is a major consideration in students' decisions to undertake graduate studies. Financial considerations are going to become a great deal more important as fees increase, part-time employment opportunities become more difficult to find, and concerns mount about accumulating debt in uncertain job markets. These three concerns feed on each other and are heightened to the extent that scholarship funds are increasingly scarce. It is widely acknowledged that being able to offer competitive financial support is critical in attracting the strongest students to UBC. Faculty cite examples of students saying they would have preferred to accept the offer to study at UBC but they have chosen to go elsewhere because of the better financial support that has been offered. On the other hand, there appear to be a variety of creative ways in which graduate students interested in environment and natural resources studies might be able to obtain financial assistance from users of their research and potential employers.

Action options:

- (i) Compile information and guidance on financial assistance options: One of the major problems identified by students and faculty is the lack of readily available information regarding the financial support potentially available in the resources and environmental field. To address this problem and to assist students and faculty advisors, an inventory could be compiled that is specific to this field. It could be made available in appropriate ways, as suggested above, in a revised Calendar, an ENR Studies brochure, and a system of home pages on the WWW.
- (ii) Facilitate applications for funding: To ensure applications make the strongest possible case, faculty and students need to be well-informed about the best ways to do this for particular sources relevant to the environment and natural resources area. A workshop could be organized to develop specific guidelines for both student applicants and faculty writing letters of recommendation.
- (iii) Actively coordinate and seek funding: In this era of restraint, creative and flexible fund raising strategies are required. In the area of environment and natural resources there appear to be opportunities for negotiating funding from government agencies and private companies. Three types of opportunities are suggestive of what might be possible. The first is the possibility of developing "research desks" for particular topics (e.g. green house gas reduction strategies) being explored by SDRI, which might be funded by small contributions from a number of external bodies, and which would then be awarded to a particular student by competition. The second would capitalize on the interest of some employers in supporting their most promising young employees to undertake a graduate degree. The third exploits the interest of government agencies in having research undertaken on specific topics which they would support by providing a contribution agreement. A workshop could be held to examine experience with examples of different approaches

among faculty and students and to develop a strategy for exploring interest among public and private organizations in shaping new funding approaches.

7.3.3 Job placement

Job opportunities upon graduation is a topic of great concern to graduate students and a factor that can be important in the recruitment process. The Faculty of Commerce has recognized this and in order to compete with other universities has set up their own placement office primarily for their MBA students. Such an initiative is very expensive and beyond the budget of most faculties. In other departments such as Engineering, third and fourth year students organize job finding activities for the graduating class and students looking for summer employment.

Activities at the graduate level, including the area of environment and natural resources, seem to be less organized. At present FOGS students act independently in their job searches, taking advantage of facilities available on campus (e.g. the UBC Placement Office, notice boards etc.) and personal contacts that may develop from their thesis research or contacts with employers through temporary employment.

Action options:

- (i) A graduate student initiative: A more coordinated, student organized, placement effort within FOGS could be valuable in identifying and distributing information about employment opportunities (both part-time during the academic year and upon graduation), tracking the jobs obtained by graduates, organizing job fairs and liaising with professional associations and organizations to promote the environmental and natural resources graduate programs in FOGS. Resource material of employers could be made available through FOGS units and coordinated with other groups such as the Graduate Student Society and the UBC Placement Office. Such an effort that is student run may better reflect the diversity of FOGS graduates, be more cost effective than a faculty placement office and provide valuable experience to students in developing their own employment seeking skills.
- (ii) A mentoring program: Alumni and professionals who are practicing in the ENR field could be asked to volunteer to mentor students during their graduate studies, providing advice on all aspects of their career preparations. SCARP has such a program, which operates by seeking volunteers in the planning profession and maintaining a list of people whom students may contact with a view to setting up a mentoring relationship.

8. Strategies and Recommendations for Implementation

In this section, we discuss various strategies that could be pursued to further the process of coordination and integration. In essence, the strategies comprise different levels of “intervention” for the various actions outlined in Section 7. We also provide recommendations about the strategy we believe it would be useful to pursue in the near term, and suggestions for the longer term.

Before turning to a discussion of strategies, we consider further what we have termed the “systemic” issues regarding coordination of teaching and research units in FOGS, and make suggestions for addressing them.

8.1 Potential Role for Strategic Planning Among the ENR Units in FOGS

The need for greater integration among the ENR programs in FOGS is due at least in part to the way these programs have been established and built. Historically, the number of research and teaching units in FOGS was small, and they occupied only a small portion of the Dean’s time and attention. In recent years, the number has grown sharply, with several new units focusing on various aspects of important environmental and resource management issues facing society. Each new program was subjected to the “new program review process” in the New Programs and Curriculum Committee of FOGS, and then in the Senate. In these review processes, attention is placed on internal and external consultation as the main way in which potential course and program redundancies or other issues are flagged.

While these processes are effective in identifying obvious overlaps, they have no real basis for identifying whether the new program is a “good fit” with the other existing programs in the faculty, particularly in terms of contributing to an overall strategy and direction for FOGS. Nor do they work well in suggesting how the existing and new programs can share resources or achieve other synergies. New courses or programs in faculties such as Arts or Sciences are subjected to a review within the faculty before proceeding further in the university’s approval process. Such an internal review process does not exist within FOGS. Yet these questions are likely to be far more important for FOGS than for other faculties, where the differences among the disciplinary domains of units and the mandates for units is far more clearly cut.

We believe that this “systemic” gap in overall review, strategy and direction among the ENR units in FOGS provides an opportunity to build coordination on a more fundamental level than suggested by the individual actions identified in Section 7. Specifically, we believe that one fundamental strategic issue to be addressed by this committee is how to best advance overall strategic planning and coordination as a self-defining and ongoing process among the ENR units within FOGS. We, as a committee, can make many

recommendations. But without the commitment of the Directors of units within FOGS, and an ongoing process of adaption and redesign, these recommendations will not lead to much substantial improvement.

This process could be established and maintained in various ways within FOGS, including the following:

- (i) Commitment to a one-shot strategic planning process of a few days in duration among the ENR units, which would then be implemented by an ongoing committee of the unit directors, with periodic workshops for “strategic review” as needed.
- (ii) The Vice President of Research and the Dean of FOGS both contribute resources to freeing time for a faculty member, or hiring an experienced consultant, to conduct a strategic planning process as a one-person undertaking, and then help foster its implementation.
- (iii) An Associate Dean for FOGS to oversee planning and administration of the FOGS units.
- (iv) Explicitly place responsibility for strategic planning and coordination of teaching activities within FOGS to one of the unit directors, possibly the director of SCARP or RMES.

There are potential difficulties and costs associated with each of these approaches, including:

- (i) Nearly all the approaches require the directors to do their existing jobs, and also become involved in “creating and managing change” among all the ENR units at the same time, which can be demanding.
- (ii) When the university is facing major budget cutbacks, scenarios involving addition of administrative staff are unlikely to be realized.
- (iii) Too rigid or constraining a plan would stifle the adaptability and quick creative responses that will be needed to pursue new opportunities.
- (iv) Unit heads would likely resist moves that greatly decrease their independence, without some clear evidence of corresponding benefits of other kinds.

In sum, we need a process that is low cost in terms of time and money, that will lead to better coordination and integration, but without placing too much constraint on the flexibility or independence of the units.

Our suggestion would be to opt for a brief one shot strategic planning process among the ENR unit directors and selected faculty, as well as an ongoing sub-committee of the directors to address issues of coordination and integration on an ongoing basis. By building on this report and doing a great deal of work before the planning process begins, in terms of defining the issues, objectives and alternatives, perhaps with some outside help, the group should be able to make considerable progress in a focused effort that involves a set of meetings spread over a few weeks. This approach would provide the administrative context and implementation process for the strategy alternatives outlined below.

8.2 Alternative Strategies

Turning to the actual strategies to be considered, we can identify four alternative approaches:

- (i) Do Nothing: ENR programs in FOGS would maintain the status quo.
- (ii) Incremental Coordination: ENR programs in FOGS would make incremental steps toward coordination by undertaking the steps single asterisked* in Table 3.
- (iii) Moderate Coordination and Integration: ENR programs in FOGS would make more active steps toward coordination and also some moves toward integration of programs, as double asterisked** in Table 3.
- (iv) Substantial Coordination and integration: ENR programs in FOGS would make highly active and aggressive steps toward coordination and integration of programs, as triple asterisked in Table 3.

RECOMMENDATION: The Dean should ask the units to undertake the activities involved in incremental coordination immediately. We also recommend that he provide strong direction that he would like the units to commit to some or all the actions under the moderate and substantial levels of coordination and integration, once the strategic planning efforts outlined earlier can be completed.

Our basis for these recommendations is straightforward. We see substantial benefits associated with the more dramatic levels of coordination and integration, and little cost, except for the time and effort needed to begin doing things differently. We do not underestimate how difficult it is to achieve any sort of procedural change in an organization: resistance to change can be enormous. However, we believe that the costs of overcoming this resistance should be manageable in this case. Note that the unit directors may have a somewhat different view of these costs, because they may see that they are giving up some of their unit's autonomy, identity or power if more active coordination and integration are pursued. We believe that the collective benefits (and benefits to each unit) would dramatically outweigh the costs. Here we define benefits and costs in terms of the objectives articulated earlier for this committee.

9. A Structure for ENR Program Management in FOGS

One implication of the recommendations for more coordination and integration is that some type of structure for these programs within FOGS will inevitably be needed. In the simplest and most prosaic example, the issue of structure arises in what to call an overall “home page” on the Internet which covers all the FOGS ENR programs. At the other extreme, the issue could arise in deciding how all units could be integrated into a “network” with one Associate Dean as administrator, one overall identity, one curriculum and one budget with various separate components. The point is that FOGS unit directors should begin to consider, as part of strategic planning, what kind of structure would be desirable.

There is no easy answer as to how best to cast such a structure. However, we offer two suggestions:

- (i) Efforts toward developing such a structure should begin by getting a commitment to a vision, such as the one we recommend, and then turn to how best to get there drawing on the recommendations for action that we have made.
- (ii) Proceeding slowly and incrementally is mandatory in getting the participants comfortable with the notion of a structure, before attempting any dramatic changes. We would suggest that beginning with a simple notion such as “Programs in Environment and Natural Resources” or “The Environment and Natural Resources Network”, which comprise all the ENR-related units in FOGS, would be the best place to start.