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## Curricular Report No. 1997-98-5B from the Graduate Council to the Faculty Senate: Proposal for a Doctor of Philosophy in Environmental Sciences

University of Rhode Island Faculty Senate

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UNIVERSITY OF RHODE ISLAND  
Kingston, Rhode Island  
FACULTY SENATE  
BILL  
Adopted by the Faculty Senate

TO: President Robert L. Carothers  
FROM: Chairperson of the Faculty Senate

1. The attached BILL, titled Curricular Report No. 1997-98-5B from the Graduate Council to the Faculty Senate: Proposal for a Doctor of Philosophy in Environmental Sciences, is forwarded for your consideration.
2. The original and two copies for your use are included.
3. This BILL was adopted by vote of the Faculty Senate on February 26, 1998.
4. After considering this bill, will you please indicate your approval or disapproval. Return the original or forward it to the Board of Governors, completing the appropriate endorsement below.
5. In accordance with Section 10, paragraph 4 of the Senate's By-Laws, this bill will become effective March 19, 1998, three weeks after Senate approval, unless: (1) specific dates for implementation are written into the bill; (2) you return it disapproved; (3) you forward it to the Board of Governors for their approval; or (4) the University Faculty petitions for a referendum. If the bill is forwarded to the Board of Governors, it will not become effective until approved by the Board.

February 27, 1998  
(date)

  
Leland Jackson  
Chairperson of the Faculty Senate

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ENDORSEMENT

TO: Chairperson of the Faculty Senate  
FROM: President of the University

Returned.

- a. Approved \_\_\_\_.
- b. Approved subject to final approval by Board of Governors ✓.
- c. Disapproved \_\_\_\_.

3.9.98  
(date)

  
President

3/18/99

UNIVERSITY OF RHODE ISLAND  
The Graduate School

Curricular Report from the Graduate Council to the Faculty Senate  
Report No. 1997-1998-5B

DOCTOR OF PHILOSOPHY IN ENVIRONMENTAL SCIENCES

At Meeting No. 344 held on 23 January, 1998, the Graduate Council approved the following proposal which is now submitted to the Faculty Senate.

S E C T I O N I

BACKGROUND INFORMATION

ABSTRACT

The Graduate Council approved the proposal for a Ph.D. degree in Environmental Sciences and voted to recommend approval at the Class A level (the program is deemed to be of such merit as to justify the recommendation of the immediate allocation of funds for its implementation). The proposed multidisciplinary program would be offered through the College of Resource Development. The new program would replace three Ph.D. programs, admissions for which were suspended in 1995 or 1996: those offered by Departments of Fisheries, Animal, and Veterinary Science; Natural Resources Science; and Plant Sciences. The degree also would serve the Department of Geology which has not previously offered the Ph.D.

BACKGROUND

The Ph.D. in Environmental Sciences is proposed for students from the College of Resource Development whose primary research interests are in the ecological, life, earth, or natural resource sciences. Consolidation of the three programs emphasizes the breadth of environmental science, and makes more visible the opportunities available at the Ph.D. level in the College of Resource Development.

The proposal was reviewed under the new process established by the Faculty Senate in which the Graduate Council serves as the Coordinating and Review Committee for new graduate program proposals. Announcements of the receipt of the proposal were sent to the President and the Joint Educational Policy Committee, the Provost and the Council of Deans, the Budget Office, and Department Chairs and Graduate Directors. Recommendations were sought from each of these groups. Received comments and recommendations are appended, have been kept on file in the Graduate School, and were considered in the Graduate Council's review.

The Budget Office concluded that the Ph.D. in Environmental Sciences would require no new resources. The proposal elicited no negative comments from the Council of Deans, and it was endorsed by the Joint Educational Policy Committee.

S E C T I O N   I I

**RECOMMENDATION**

The Graduate Council approved the following proposal for a new Ph.D. degree in Environmental Sciences, and presents it to the Faculty Senate with the recommendation that it be approved at the Class A level - the program is deemed to be of such merit as to justify the recommendation of the immediate allocation of funds for its implementation.

**PROPOSAL FOR A DOCTOR OF PHILOSOPHY IN ENVIRONMENTAL SCIENCES**

**A. PROGRAM INFORMATION**

**1. Name of Institution:**

University of Rhode Island

**2. Departments and Colleges Involved:**

Departments of Fisheries, Animal and Veterinary Science;  
Geology; Natural Resources Science; and Plant Sciences;  
College of Resource Development

**3. Title of Proposed Program:**

Ph.D. Environmental Sciences

**4. Effective Date of Change:**

September 1998

**5. Anticipated Date for First Degree Granted:**

May 2001

**6. Intended Location of Program:**

Kingston Campus of the University of Rhode Island

**7. Institutional Review and Approval Process:**

	Date approved
Department of Fisheries, Animal, and Veterinary Science	<u>11/18/97</u>
Department of Geology	<u>1/22/97</u>
Department of Natural Resources Science	<u>1/24/97</u>
Department of Plant Sciences	<u>10/20/97</u>
College of Resource Development	<u>11/19/97</u>
Graduate Council	<u>1/23/98</u>

President of the University

8. **Summary of the Proposed Program Change:** The Ph.D. in Environmental Sciences is proposed as a multidisciplinary degree program designed for students from the College of Resource Development whose primary research interests are in the ecological, life, earth, or natural resource sciences. The new program would replace three Ph.D. programs that were suspended in 1995 or 1996, those offered by the Departments of Fisheries, Animal, and Veterinary Science; Natural Resources Science; and Plant Sciences. The degree would also serve the Department of Geology, which has not previously offered the Ph.D. Consolidation of these programs will emphasize, and make more visible, the breadth of environmental science opportunities available at the Ph.D. level in the College of Resource Development, and it will provide a starting point for the development of a truly interdisciplinary approach to environmental problem-solving at the doctoral level.
9. **Statement on Resource Needs:** Implementation of the Ph.D. in Environmental Sciences will require no new or additional resources. The new program represents a consolidation of existing Ph.D. programs and a minor expansion to include the Department of Geology. Current faculty, staff, courses, budgets, and facilities are sufficient to support this program.
10. **Signature of the President**

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 Robert L. Carothers

11. **Persons to be Contacted During the Review**

Dean Margaret Leinen  
 College of Resource Development  
 Woodward Hall  
 874-2957

Blair M. Lord  
 Vice Provost  
 Academic Programs  
 874-2447

Associate Dean William Wright  
 College of Resource Development  
 Woodward Hall  
 874-2904

**B. RATIONALE**

President Carothers has identified the Marine and Environmental Focus as one of four major areas which he feels deserve major emphasis at the University of Rhode Island. The College of Resource Development (CRD) includes a majority of the faculty, students, and programs--both graduate and undergraduate--on this campus that can be categorized as "environmental". CRD addresses topics as wide ranging as entomology, fisheries science, coastal

geomorphology, hydrogeology, soil biogeochemistry, water resources science, plant ecology, wildlife ecology, wetland ecology, forest science, microbial ecology, conservation biology, and landscape ecology. Over the last 25 years, CRD has undergone a major metamorphosis, from a college that was primarily agricultural in nature to one that addresses a broad spectrum of basic and applied environmental and life science issues. In 1998, the changes continue at a more rapid pace than ever before. With the addition of the Department of Geology to the College, new and stronger alliances are being forged between physical and biological scientists, chemists and ecologists. The addition of the Department of Biochemistry, Microbiology, and Molecular Genetics to CRD would broaden the horizons and increase interdisciplinary opportunities even more. It is clear that URI needs to capitalize on its strengths in the environmental realm.

It is also clear that the environmental problems that face society today are far more complex than ever before. Multidisciplinary problem-solving has become the rule not only in University research, but also in the environmental management efforts of governmental agencies and private corporations. It is against this backdrop that CRD wishes to launch a new Ph.D. program in Environmental Sciences. Our thinking is that this new program would eventually be a college-wide degree program that would serve all of those departments, faculty, and students whose interests and expertise revolve around teaching, research, and outreach in environmental science and management. While the Ph.D. in Environmental Sciences is a natural science degree, significant interaction with the social sciences, especially the Departments of Community Planning and Area Development, Environmental and Natural Resource Economics, and Marine Affairs is expected.

Creation of the Ph.D. in Environmental Sciences would promote and enhance interdisciplinary research and teaching in a key focus area at URI. It would also greatly heighten the visibility --regionally, nationally, and internationally-- of URI's wealth of environmentally related courses, research projects, and faculty expertise. The new degree program would form a bridge between programs that, while strong in their own right, have been scattered and often disconnected. Until 1995, the Departments of Fisheries, Animal, and Veterinary Science; Natural Resources Science; and Plant Sciences offered Ph.D. degrees under the University-wide Biological Sciences umbrella. These programs were suspended between 1995 and 1996 due to low enrollments. The Ph.D. in Environmental Sciences would replace these departmental programs and, at the same time, create doctoral study opportunities in Geology. Visibility of graduate programs hinges partly on availability of resources (including faculty, courses, assistantships, and research budgets and facilities) and partly on the presence of a critical mass of students. The consolidation of both resources and students under a single Ph.D. program in Environmental Sciences, as well as more vigorous recruiting, should guarantee program viability.

### **C. INSTITUTIONAL ROLE**

As noted above, the "Marine and Environmental Focus" is one of four areas of excellence that President Carothers wishes URI to



pursue. Creation of two new graduate degree programs in the College of Resource Development--the Ph.D. in Environmental Sciences and the Master of Science in Environmental Sciences (see attached proposal)--represents a major step toward the President's goal. Multidisciplinary degree programs will greatly enhance collaboration among faculty, research staff, and students; help the College and University to better define and focus its mission in the environmental science and management arenas; and attract attention from the best and brightest young people who are seeking an institution that will provide them with the tools to solve today's pressing environmental problems.

URI--and the College of Resource Development in particular --already enjoys an excellent reputation in the environmental sciences. Development of multidisciplinary graduate degree programs in this field is a formal way of marshalling the diversity of talent and energy that we already have and focusing it toward the pursuit of institutional, as well as program, excellence.

#### **D. INTERINSTITUTIONAL CONSIDERATIONS**

The University of Rhode Island has traditionally placed far more emphasis on environmental studies than other institutions of higher education in this State. We are clearly the leader in the number of faculty and courses devoted to environmental science and in the breadth of environmental research. Because our major goal in creating the Ph.D. in Environmental Sciences is to emphasize and enhance multidisciplinary studies of the graduate level, it is unlikely that there will be any adverse impacts to programs at other institutions, where environmental studies tend to be much more narrowly focused. Creation of this new degree program does not represent an expansion of our role in the State; it will simply help us to be more effective at what we already do. The creation of a multidisciplinary Ph.D. degree may also provide attractive opportunities for graduates of other state institutions who might wish to pursue such a degree.

#### **E. CONTENT**

- 1. Overview:** The proposed Ph.D. in Environmental Sciences is a multidisciplinary, interdepartmental degree that is designed to serve students in the College of Resource Development whose research interests are in basic or applied aspects of environmental science. Initially, this program will serve graduate students from the Departments of Fisheries, Animal, and Veterinary Science; Geology; Natural Resources Science; and Plant Sciences. In future years, it may be expanded to include other related disciplines or individual faculty from the College.

The Ph.D. in Environmental Sciences would replace the following programs:

- Ph.D. in Fisheries, Animal, and Veterinary Science (Biological Sciences)
- Ph.D. in Natural Resources (Biological Sciences)
- Ph.D. in Plant Sciences (Biological Sciences)

It would also provide the opportunity for students in the Department of Geology to obtain a Ph.D. degree.

2. **Admission Requirements:** GRE and bachelor's degree in a biological science, physical science, natural resources science, or engineering; specific undergraduate majors or coursework may be required for certain fields of study. Master's degree with thesis in biological science, physical science, or natural resources science is highly recommended.
3. **Program Requirements:** A minimum of 72 credits of advanced coursework beyond the bachelor's degree (a master's degree may count for up to 30 credits), 18 of which are dissertation credits and at least 2 of which are graduate seminar; comprehensive examination; and dissertation. A qualifying examination will be required for students who are admitted without a master's degree and may be required for students whose prior degrees are outside of the proposed Ph.D. field of study.
4. **Fields of Study Represented:** The Ph.D. in Environmental Sciences will incorporate, at a minimum, the fields of study listed below. (NOTE: Formal specializations will be far fewer in number, but given the urgent need to reinstate the CRD Ph.D. programs that were suspended, specializations are not being proposed at this time. They will be proposed as soon as the Environmental Sciences Faculty have had full opportunity to draft and discuss them as a group. In the interim, decisions on specific program requirements will be made by each student's program committee.)

animal virology	water resources science
aquatic pathology	wildlife ecology
aquacultural science	wetland ecology
sedimentology	forest science
stratigraphy - paleontology	microbial ecology
coastal geomorphology	GIS and spatial analysis
glacial geology	landscape ecology
hydrogeology	conservation biology
applied geophysics	plant ecology and physiology
geoarchaeology	plant molecular biology and genetics
remote sensing	plant pathology
petrology	plant protection
structure and tectonics	environmental horticulture
planetary geology	environmental plant biology
soil chemistry	sustainable agriculture
soil biochemistry	entomology
soil genesis and classification	integrated pest management

5. **Existing Program Courses:** Course selections for the Ph.D. in Environmental Sciences will come primarily from existing offerings by the Departments of Fisheries, Animal, and Veterinary Science (ASP, AVS, FST); Geology (GEL); Natural Resources Science (NRS); and Plant Sciences (PLS, ENT); a complete listing appears below. These courses will be supplemented by selections from related departments such as Biochemistry, Microbiology, and Molecular Genetics;



Biological Sciences; Civil and Environmental Engineering;  
Food Science and Nutrition; Oceanography; Statistics;  
Community Planning and Area Development; Environmental and  
Natural Resource Economics; and Marine Affairs.

ASP 501,502	Seminar
ASP 532	Experimental Design
ASP 534	Animal Virology
ASP 536	Virology Laboratory
ASP 538	Epidemiology of Viral and Rickettsial Diseases
ASP 555,556	Pathology Rotation
ASP 581	Current Topics in Molluscan Aquaculture
ASP 584	Advanced Aquaculture Systems
ASP 586	Fish Nutrition
ASP 591,592	Special Projects
AVS 591,592	Research Problems
ENT 519	Insect Biological Control
ENT 520	Insect Morphology and Physiology
ENT 529	Systems Science for Ecologists
ENT 533	Graduate Writing in Life Sciences
ENT 544	Insect Ecology
ENT 550	Insect Taxonomy and Systematics
ENT 555	Insect Pest Management
ENT 561	Aquatic Entomology
ENT 571	Insect Microbiology
ENT 591,592	Special Problems in Entomology
FST 510	Applied Problems in Marine Fisheries Ecology
FST 516	Early Life History of Aquatic Resource Animals
FST 521	Evaluation of Fish Capture Systems
FST 591,592	Special Problems
GEL 515	Glacial Geology
GEL 530	Igneous Petrology
GEL 531	Metamorphic Petrology
GEL 550	Sedimentary Processes and Environments
GEL 554	Sedimentary Petrology
GEL 565	Advanced Interpretation in Applied Geophysics
GEL 568	Isotopes in Hydrogeology
GEL 577	Coastal Geologic Hazards
GEL 580	New England Geology
GEL 581	Topics in Tectonic Geology
GEL 583	Advanced Hydrogeology
GEL 590,591	Special Problems
NRS 500	Graduate Seminar
NRS 505	Biology and Management of Migratory Birds
NRS 509	Concepts of GIS and Applications in Environmental Science
NRS 510	Soil-Water Relations
NRS 522	Advanced GIS Analysis of Environmental Data
NRS 523	Water Pollution Microbiology
NRS 525	Wetland Field Investigations
NRS 526	Microbial Ecology of Soils and Sediments
NRS 532	Conservation Biology
NRS 534	Ecology of Fragmented Landscapes

NRS 555	Applied Coastal Ecology
NRS 567	Soil Genesis and Classification
NRS 568	Recent Advances in Natural Resources Science
NRS 582	Seminar in Soil Ecology and Biochemistry
NRS 591,592	Special Problems
PLS 501,502	Graduate Seminar in Plant Sciences
PLS 511	The Nature of Plant Disease
PLS 512	Plant Growth and Development
PLS 513	Laboratory Plant Tissue Culture
PLS 572	Plant Biochemistry
PLS 576	Environmental Plant Physiology
PLS 591,592	Nonthesis Research in Plant Sciences

**6. New Program Course:**

EVS 699 Doctoral Dissertation Research (I and II) To be taken by students in the Ph.D. in Environmental Sciences degree program. Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

- 7. Program Faculty:** Initially, all tenure-track Graduate Faculty in the Departments of Fisheries, Animal, and Veterinary Science; Geology; Natural Resources Science; and Plant Sciences (including Entomology) would be eligible to supervise, or serve on the committees of, graduate students enrolled in the Ph.D. in Environmental Sciences degree program. Those faculty are listed below along with adjunct faculty, who also may serve on graduate student committees. In future years, other faculty from the College of Resource Development may be added to this list, provided that their training and research expertise are within the field of environmental science.

Steven R. Alm, Associate Professor, PLS  
 Jose A. Amador, Assistant Professor, NRS  
 Peter V. August, Professor and Chair, NRS  
 Carl H. Beckman, Professor Emeritus, PLS  
 David Berlinsky, Adjunct Assistant Professor, FAVS  
 Joel Bodammer, Adjunct Associate Professor, FAVS  
 Jon C. Boothroyd, Professor, GEL  
 Terence M. Bradley, Associate Professor, FAVS  
 James H. Brown, Professor Emeritus, NRS  
 P.A. Buckley, Adjunct Professor, NRS  
 J. Allen Cain, Professor, GEL  
 Richard A. Casagrande, Professor, ENT (PLS)  
 Joel M. Chandlee, Associate Professor, PLS  
 Pei Wen Chang, Professor Emeritus, FAVS  
 Jana E. Compton, Assistant Professor, NRS  
 Joseph T. DeAlteris, Professor, FAVS  
 Stephen L. Dellaporta, Adjunct Assistant Professor, PLS  
 D. Thomas Duff, Associate Professor Emeritus, PLS  
 Larry Englander, Associate Professor, PLS  
 David E. Fastovsky, Professor, GEL  
 Michael W. Fleming, Adjunct Associate Professor, FAVS  
 Reinhard K. Frohlich, Associate Professor, GEL  
 Alan D. Gettman, Adjunct Assistant Professor, ENT (PLS)

Howard S. Ginsberg, Adjunct Associate Professor, ENT (PLS)  
Arthur J. Gold, Professor, NRS  
Francis C. Golet, Professor, NRS  
Josef Gorres, Adjunct Assistant Professor, NRS  
O. Don Hermes, Professor and Chair, GEL  
Richard J. Hull, Professor, NRS  
Thomas P. Husband, Professor, NRS  
Noel Jackson, Professor, PLS  
William R. Krul, Associate Professor, PLS  
Roger A. LeBrun, Professor, ENT (PLS)  
Patrick A. Logan, AES Director and Professor, ENT (PLS)  
Anthony T. Mallilo, Associate Professor, FAVS  
Thomas N. Mather, Associate Professor, ENT (PLS)  
Brian K. Maynard, Assistant Professor, PLS  
Walter C. Mueller, Professor Emeritus, PLS  
Daniel P. Murray, Professor, GEL  
Murn M. Nippo, Professor, FAVS  
Peter W.C. Paton, Assistant Professor, NRS  
Jan Pechenik, Adjunct Associate Professor, FAVS  
Conrad C. Recksiek, Associate Professor, FAVS  
Richard C. Rhodes, Professor and Chair, FAVS  
Michael A. Rice, Associate Professor, FAVS  
Eric M. Roberts, Adjunct Assistant Professor, PLS  
Bridget A. Ruemmele, Associate Professor, PLS  
Richard J. Shaw, Associate Professor, PLS  
Mark H. Stolt, Assistant Professor, NRS  
W. Michael Sullivan, Associate Professor and Chair, PLS  
Raymond B. Taylorson, Adjunct Professor, PLS  
Anne I. Veeger, Associate Professor, GEL  
Ulysses G. Whitworth, Assistant Professor, FAVS  
Richard E. Wolke, Professor, FAVS

#### **F. EVALUATION**

The proposed program will be evaluated annually by the College of Resource Development's Graduate Programs Committee and by the University as a part of the annual program review. Key criteria at the College level will be total enrollment, number of graduates, and average program duration. If enrollments are low despite vigorous recruitment efforts, the viability of the program will be reviewed and changes will be made to remedy the problem.