1/15/02

Department of Environmental and Natural Resource Economics

Strategic Plan

2002

Coastal Institute

University of Rhode Island

Kingston, RI 02881

I. Vision & Mission

Mission Statement

The mission of the Department of Environmental and Natural Resource Economics is to maintain and strengthen our position as an internationally recognized leader in the application of economics to study the use of environmental resources; especially coastal and marine resources, fisheries, water, and land. The Department achieves this through: 1) setting the highest standards in graduate and undergraduate teaching of economics and quantitative methods necessary to evaluate institutional structures, policies, and practices for effective management of natural resources and ecosystems; 2) conducting substantive and timely research addressing environmental issues; 3) continually pursuing new and innovative methods and multidisciplinary approaches to push forward the frontier of environmental and natural resource economics; and 4) communicating our knowledge to citizens and those empowered to employ this information for improved use of natural resources within the state, throughout the nation, and in the international community.

A. Research

The Department has an internationally recognized research program that is highly successful in obtaining funds from the USDA, Sea Grant, EPA, NSF, and other funding agencies. Our research in the areas of fisheries and aquaculture management, market-based mechanisms for environmental management, assessment of public values for natural amenities, fisheries and international trade, bioeconomic modeling, damage assessment of environmental disasters, and nonmarket valuation is on the cutting edge. We will maintain our strengths in these areas and enhance our position in several emerging areas. To maintain our competitiveness, the Department is expanding the tools we use to study decision-making by incorporating the new field of experimental economics into its research agenda. We intend to become the leader in applying experimental methods and interactive simulation to advance the study of environmental problems. Other emerging areas of strength include: spatial analysis of terrestrial and marine ecosystems with linkage to GIS, analysis of market institutions, marine transportation, container and port-related issues, and collective decision-making processes.

B. Teaching

1. Graduate:

   The Department recognizes the national and international need for well-trained graduate students to address urgent environmental issues and has been remarkably successful in placing graduates at universities, government agencies, non-government organizations (NGOs), and in the private sector. We will strive to improve course offerings and continually evaluate the quality of our MS and PhD programs. This will assure continued competitiveness of our graduates, as well as attract diverse, capable, and motivated students and maintain the value of our alumni's degree. A strong graduate program is an essential building block of our reputation, research and outreach capabilities, and grantsmanship.

2. Undergraduate:

   The Department offers a series of courses which provide students with economic skills that complement the training received in other undergraduate programs within CELS, such as: Natural Resources Science; Fisheries, Aquaculture, and Veterinary Science; and Marine Affairs. Several new offerings are being developed to broaden the range of courses available and to incorporate more experiential learning. We intend to aggressively pursue joint majors, such as the new Environmental Economics and Management major with Natural Resources Science (NRS). We must also increase the visibility of our undergraduate courses within the College and the University. The advising system within the University College, the quality of current student recruiting materials, and staffing limitations make this extremely challenging. With additional faculty, we will be able to restore a viable, independent major focused on equipping undergraduates with analytical tools and skills prized by government and the private sector.

C. Outreach

As an applied department at a Land Grant/Sea Grant University, ENRE is highly aware of the importance of communicating the results of our research to the community and public and private decision-makers. Most faculty members are active in outreach efforts. We contribute our professional knowledge and objective analysis to timely issues related to marine resources,

fisheries and aquaculture policy and regulation, land and water policy and regulation, environmental litigation, tourism, international trade and development, and corporate and consumer decision-making. Our outreach efforts range from local to international in scope.

II. Current Status

A. Research

1. Strengths:

The faculty and graduate students have identified the following research areas where ENRE is a recognized leader.

- A traditional strength of ENRE is fisheries management and marine resource economics. Expertise in these areas distinguishes ENRE from competing programs. Within these areas, the evaluation of market mechanisms versus command and control regulation has been a consistent theme. More recently, we have committed considerable attention to emerging areas, such as fisheries, marketing and trade, and aquaculture.
- ENRE has developed a well-recognized capability in the use of non-market valuation tools, survey-based methods, and conjoint analysis.
- ENRE has demonstrated excellence in the use of bioeconomic models and models which incorporate physical and ecological systems into an economic framework.
- The quality and international reputation of the ENRE faculty in the use of market-based and non-market evaluation of pollution events and damage assessment has been recognized by our active role in the *North Cape, Glacier Bay, Exxon Valdez,* and many other oil spills.

2. Other Areas of Expertise:

- Multidisciplinary research with scientists in Natural Resources Science; Fisheries Biology, Physical & Biological Oceanography, Political Science, Wetlands, Aquaculture, and Psychology.
- Tourism economics; community development/natural resource-based tourism.
- Resource economics in water use in developed and developing countries.
- The economics of natural resource damages.

3. Emerging Strengths:

ENRE has considerable emerging strength as outlined below:

A. SimLab and Experimental Economics

- Use of technology-based tools, such as virtual reality, to help interested parties better visualize the consequences of policy decisions.
- Use of experimental economics to design and evaluate markets and other institutions as management mechanisms in fisheries, land use, coastal use, preservation, and invasive species.
- Potential leadership in the new and rapidly growing field of market institutions and political institution design to facilitate the solution of environmental issues using experimental economics.
- Use of the SimLab to improve understanding of how collective decisionmaking and human behavior influence choices and actions.

B. Spatial Economic Analysis

- Analysis of spatial data and linkage with GIS.
- Spatial analysis of marine and terrestrial ecosystems with application to spatially based policy analysis.
- Analysis of urban sprawl and rural community development.

C. Economics of Marine Transportation/Port Development/Dredging

4. A Potential Emerging Area:

- Potential to use market and non-market valuation methods to determine the costs (benefits) of bioterror, biotechnology, environmental uncertainty, and related management policies.

5. Grants:

Recognition of ENRE's strength is indicated by our success in obtaining grants, professional recognition and service, and the success of our graduates. During the six fiscal years from 1994-2000, ENRE received $3,678,017 (excluding our grant for the

Coastal Institute Building). This is an average of $613,033 per year. (Another measure of ENRE's success is indicated by grant expenditures. Between 1999-2001, ENRE averaged $826,571.) These amounts exceed all other related social science programs at URI by a considerable margin, and even more remarkably, exceed the grant funding of the entire College of Business.

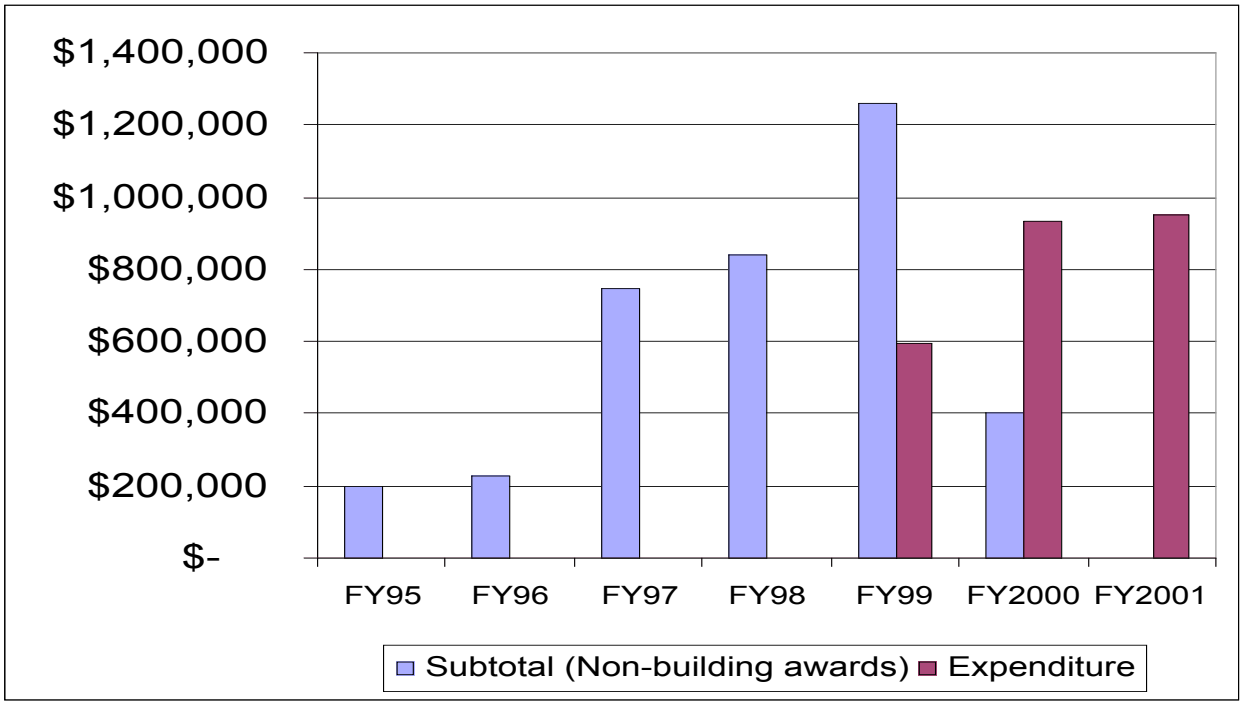
Department of Environmental & Natural Resource Economics: Grants

	FY95	FY96	FY97	FY98	FY99	FY00	FY01
Kingston Coastal Institute Bldg.	$6,054,740	$3,738,380	$ -	$ -	$ -	$ -	na
Grants Awarded	$ 196,107	$ 225,284	$ 748,953	$ 830,382	$1,244,652	$ 402,054	na
URI Foundation	$ 4,392	$ -	$ 450	$ 11,043	$ 14,700	$0	na
Subtotal (Non-building Awards)	**$ 200,499**	**$ 225,284**	**$ 749,403**	**$ 841,425**	**$1,259,352**	**$ 402,054**	**na**
TOTAL	**$6,255,239**	**$3,963,664**	**$ 749,403**	**$ 841,425**	**$1,259,352**	**$ 402,054**	**na**
Expenditure	na	na	na	na	$ 594,484	$ 932,660	$952,568
Grants Applied for (#)	9	16	10	14	9	16	na
Grants Applied for ($)	$1,050,232	$ 971,818	$1,055,579	$1,130,168	$6,522,033	$3,204,695	na
Success Rate	19.1%	23.2%	71.0%	74.5%	19.3%	12.5%	na

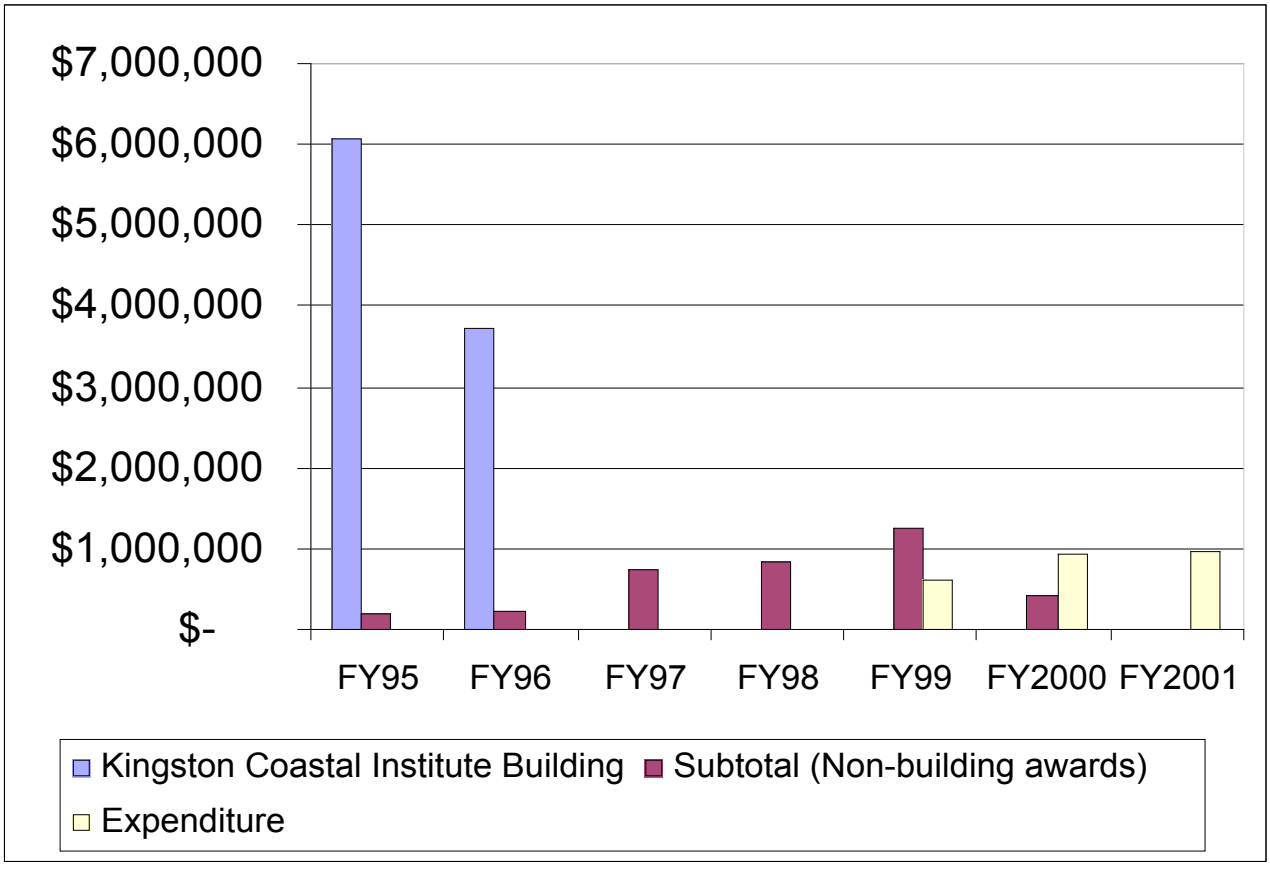
	Total 1994-00	Average Per Year 1994-00
Kingston Coastal Institute Building	$ 9,793,120	$1,632,187
Grants Awarded	$ 3,647,432	$ 607,905
URI Foundation	$ 30,585	$ 5,098
Subtotal (Non-Building Awards)	**$ 3,678,017**	**$ 613,003**
TOTAL	**$13,471,137**	**$2,245,190**
Grants Applied for (#)	74	12
Grants Applied for ($)	$13,934,525	$2,322,421
Success Rate	26.4%	26.4%

This amount must be augmented by the funding obtained primarily by Tom Weaver and others in ENRE for Coastal Institute Building and the future Aquaculture Facility. This amounted to over $12,000,000 during the past decade. This ENRE leadership has been a tremendous boon not only to the Department, but also to NRS, FAVS, the College, and the University in general.

ENRE External Grants Received 1995-2001 (Excludes Agric. Exp. and Building grants)



ENRE External Grants Received 1995-2001 (Excludes Agric. Experiment Station)



6. Professional Awards and Recognition:

a) National Research Council

- National Academy of Sciences, National Research Council, Ocean Studies Board Jon Sutinen
- National Academy of Sciences, National Research Council Scientific Panels
  - James Anderson (Marine Aquaculture)
  - Jon Sutinen (Atlantic Salmon in Maine)
  - James Opaluch (Wetland Functions and Values; PCB Contaminated sediments)

b) Editorial Positions

- *Marine Resource Economics*, Editors – James Anderson, Cathy Wessells; Founding Editor - Jon Sutinen; Book Review Editor – John Gates
- *Journal of Environmental Economics and Management*, Associate Editor – Stephen Swallow; Editorial Council – James Opaluch, Stephen Swallow, James Anderson
- *American Journal of Agricultural Economics,* Associate Editor – James Opaluch
- *Aquaculture Economics & Management*, Editorial Board – James Anderson
- *Journal of Travel Research,* Editorial Review Board – Timothy Tyrrell
- *Review of Agricultural and Resource Economics,* Editorial Council – Cathy Wessells
- *Ocean Policy Research*, Editorial Council – Thomas Grigalunas

c) Professional Associations

- Northeastern Agricultural and Resource Economics Association, President – Stephen Swallow; Past President – James Opaluch
- Association of Environmental and Resource Economists, Director – Stephen Swallow; Past Vice President – James Opaluch
- International Institute for Fisheries Economics and Trade, Chair, Executive Committee – Jon Sutinen

7. Weaknesses and Threats:

ENRE has some weakness and considerable threats to its leading research program. They include:

- Overextended faculty/personnel. During the past decade, the number of faculty, office personnel, and computer technicians/programmers declined from 14 to 9, from 3 to 1, and from 1 to 0, respectively. This is well below competing programs and has already reduced our reputation with funding agencies, undermined our ability to attract quality graduate students, and limited our ability to deliver a first-rate program. Competing programs have at least 12 tenure-track faculty (e.g., UMASS), and the typical graduate student/faculty ratio is less than 2.5 to 1. We have 9 tenure-track faculty and a graduate student/faculty ratio of 4 to 1.

Competing Programs

	URI Environmental & Natural Resource Econ.	**Oregon State Univ. - Agric. & Resource Econ.**	**Univ. of CT Agric. & Resource Econ.**	**Univ. of MA Resource Econ.**	**Univ. of MD - Agric. & Resource Econ.**	**Harvard Univ. Environmental Econ.**	**Duke Univ. School of the Environment**
Faculty (Tenure Track)	**9**	**28**	**13**	**12**	**26**	**20**	**75**
Graduate Students (MS & PhD)	35	28	27	30	55	12	90
Graduate Student/Faculty Ratio	3.9	1.0	2.1	2.5	2.1	0.6	1.2

- ENRE does not have the level of expertise required for a top-notch environmental economics program in the areas of air pollution analysis; the critical area of energy policy and economics; and analysis of water issues, especially supply/demand in urban areas. We are unable to leverage funding in these areas, all of which are critical in New England, as well as nationally and internationally.
- There is a lack of depth of intellectual resources at URI outside of ENRE. In particular, the Economics Department lacks a graduate program.
- The University's upper administration does not appear to fully appreciate the role research plays in establishing a university's reputation and in economic development.

Because of this, ENRE does not receive appropriate recognition or support for its strengths and contributions in these areas.

- Low graduate research assistantship stipends and high tuition and fees are severely undermining our ability to attract talented domestic students. For example, UC Santa Barbara is offering graduate students in its Economics and Environmental Science program $18,000/year plus tuition and fees. This amounts to more than twice what our students are offered. Our students, after subtracting mandatory fees, receive $7,892 for the nine-month academic year, or $876 per month before taxes. Clearly, schools such as UC Santa Barbara will win this competition if URI doesn't implement more realistic and competitive options. URI's graduate stipend also compares unfavorably to our closest peer institution. Graduate research assistants at the University of Connecticut receive $13,541 per nine-month academic year after subtracting mandatory fees and insurance. This is 71 percent more than the support given to URI research assistants.

B. Teaching:

Graduate Program

The graduate program is the primary focus of the Department. Currently, we enroll 35 students, of which approximately one-third are foreign, one third are female, and two-thirds are PhD students. Enrollment of domestic students historically is about 50 percent, with about 57 percent of students pursuing a PhD.

Division of Student Enrollment between MS and PhD Programs

Year	Master's Total	PhD Total	Percent PhD	Year	Master's Total	PhD Total	Percent PhD
1991-92	19	23	54.8%	1996-97	15	21	58.3%
1992-93	24	19	44.2%	1997-98	14	19	57.6%
1993-94	23	18	43.9%	1998-99	9	23	71.9%
1994-95	14	19	57.6%	1999-00	14	21	60.0%
1995-96	21	25	54.4%	2000-01	11	24	68.6%
			Average:	**1991-2001**	**16.4**	**21**	**57.1%**

The quality of the program is indicated by the placement of our graduates. As can be seen below, our students are well represented in universities, government, the private sector,

and NGOs. We expect opportunities to increase, but we expect the competition also to increase. An indicator of future opportunities was recently provided by Mark Holliday, NMFS, at a recent workshop entitled, "Training Fisheries Managers for the 21st Century." He indicated that currently NMFS is seeking to hire 12 new marine resource economists and that over 50 percent of NMFS senior staff will reach retirement age within 5 years. One of our PhD students took one of these positions, but we have no other students currently ready to take advantage of these opportunities.

- ENRE Graduate Student Statistics

1) Total Graduate Student Enrollment and Demographic Breakdown

Year	Total Students	Female (%)	Domestic	Dom. Female (%)	International	Int. Female (%)
1991-1992	42	40.5%	24	37.5%	18	44.4%
1992-1993	43	37.2%	21	47.6%	22	27.3%
1993-1994	41	41.5%	21	42.9%	20	40.0%
1994-1995	33	39.4%	20	45.0%	13	30.8%
1995-1996	46	34.8%	25	36.0%	21	33.3%
1996-1997	36	25.0%	20	35.0%	16	12.5%
1997-1998	33	27.3%	17	35.3%	16	18.8%
1998-1999	32	31.3%	14	42.9%	18	22.2%
1999-2000	35	28.6%	13	46.2%	22	18.2%
2000-2001	35	31.4%	12	41.7%	23	26.1%
Average 1991-2001	**37.6**	**33.7%**	**18.7**	**41.0%**	**18.9**	**27.4%**

PhD Graduate Student Enrollment and Demographic Breakdown

Year	PhD Total	Female (%)	Domestic	Dom. Female (%)	International	Int. Female (%)
1991-1992	23	34.8%	9	22.2%	14	42.9%
1992-1993	19	36.8%	8	25.0%	11	45.5%
1993-1994	18	33.3%	7	28.6%	11	36.4%
1994-1995	19	31.6%	8	25.0%	11	36.4%
1995-1996	25	28.0%	11	18.2%	14	35.7%
1996-1997	21	14.3%	9	33.3%	12	0.0%
1997-1998	19	26.3%	10	40.0%	9	11.1%
1998-1999	23	30.4%	9	33.3%	14	28.6%
1999-2000	21	33.3%	8	37.5%	13	30.8%
2000-2001	24	29.2%	8	37.5%	16	25.0%
Average 1991-2001	**21.2**	**29.8%**	**8.7**	**30.1%**	**12.5**	**29.2%**

MS Graduate Student Enrollment and Demographic Breakdown

Year	MS Total	Female (%)	Domestic	Dom. Female (%)	International	Int. Female (%)
1991-1992	19	47.4%	15	46.7%	4	50.0%
1992-1993	24	37.5%	13	61.5%	11	9.1%
1993-1994	23	47.8%	14	50.0%	9	44.4%
1994-1995	14	50.0%	12	58.3%	2	0.0%
1995-1996	21	42.9%	14	50.0%	7	28.6%
1996-1997	15	40.0%	11	36.4%	4	50.0%
1997-1998	14	28.6%	7	28.6%	7	28.6%
1998-1999	9	33.3%	5	60.0%	4	0.0%
1999-2000	14	21.4%	5	60.0%	9	0.0%
2000-2001	11	36.4%	4	50.0%	7	28.6%
Average 1991-2001	**16.4**	**38.5%**	**10**	**50.1%**	**6.4**	**23.9%**

2) GRE scores

Average GRE Scores of Entering Students 1997-2001

	Verbal	Quantitative	Analytical
Domestic	553	646	656
International	431	669	561
All Students	**469**	**662**	**590**

3) Positions Taken by Recent Graduates

Recent PhD Program Alumni

Graduate	Position	Organization
Juan Agar	Fishery Economist	USDC/NOAA/NMFS
Elena Besedin	Staff Economist	ABT Associates
Kathryn Bisack	Fishery Economist	NOAA/NMFS Woods Hole
Theo Brainerd	Fishery Economist	USDC/NOAA/NMFS
Priscilla Brooks	Resource Economist	Conservation Law Foundation
Roger Corey	Intl. Trade Analyst	US International Trade Commission
Jerry Diamantedes	Economist	David Miller & Associates
Steven Edwards	Fishery Economist	DOC/NOAA/NMFS
William Emerson	Fishery Economist	Organization for Economic Co-operation and Development (OECD) Paris
Quentin Fong	Assistant Professor	University of Alaska
Jusuf Gellwynn	Head	Bureau of Agriculture and Forestry Indonesia
Eyjolufur Gudmundsson	Assistant Professor	University of Akureyri-Iceland
Daniel Holland	Assistant Professor	University of Massachusetts-Dartmouth
Di Jin	Associate Scientist	Marine Policy Center, Woods Hole Oceanographic Institute
Jeffrey Kline	Research Economist	USDA Forest Service
Sang-Go Lee	Assistant Professor	Dept. of Fisheries, Pukyong Nahadi University, Korea
Wiwat Lee	Assistant Professor	Dept. of Business Management Prince of Songkla University Thailand
John MacKenzie	Professor	Department of Food and Resource Economics University of Delaware
Vishwanie Maharaj	Fishery Economist	South Atlantic Fisheries Management Council
Christopher Miller	Economist	US Environmental Protection Agency
Edward Richardson	Fishery Economist	At-Sea Processors Association
Gilbert Sylvia	Associate Professor	Dept of Agricultural and Resource Economics and Superintendent Coastal Oregon Marine Experiment Station Oregon State University
Tomislav Vukina	Associate Professor	Department of Agricultural Economics- North Carolina State University
John Ward	Fisheries Economist	USDC/NOAA/NMFS
Naomi Zeitouni	Assistant Professor	Department of Economics - University of Haifa, Israel
David Zucker	Mgr. - Market Analysis	Priceline.com

Recent MS Program Alumni

Graduate	Position	Organization
Holly Ameden	Research Technician	Water Resources Research Center
Dinesh Aryal	Resource Economist	The World Bank
Casey Bean	Agricultural Economist	USDA Foreign Agricultural Service
Sofia Bettencourt	Resource Economist	The World Bank
Kevin Blake	Economist	ICF Consulting Inc.
Michael Bush	Purchasing Manager	Darden Restaurants Inc.
Michael Carroll	Seafood Buyer	Stop & Shop Inc.
Todd Clark	Purchasing Manager	Long John Silver Restaurants Inc.
John Gauvin	Director	Groundfish Forum Inc.
Exequiel Gonzalez	Associate Director	Research and Development Division ICSED Chile
Alan Gu	Resource Economist	Battelle Northwest
Laurie Houston	Research Associate	Department of Forest Resources University of Oregon
M'Hamed Idrissi	Fisheries Economist	Institut National de Recherches Halientiques (INRH) Morocco
Stephanie Krasnoff	Energy Analyst	Xenergy Inc.
Andrea Krenier	Governor's Policy Adv.	State of Delaware
William Lombardi	Dir., Analytic Insight Grp.	Information Resource Inc.
Michael McGonagle	Statewide Recycling Program Coordinator	RI Resource Recovery Corporation
Michael McLaughlin	Resource Economist	Federal Reserve Bank of Philadelphia
Michael McNair	Resource Economist	Hagler Bailly Services Inc.
Thomas Michelman	Resource Economist	Xenergy Inc.
Kevin Needham	Environmental Analyst	Apogee Research Inc.
Lynn Smith	Economist	David Miller & Associates

b) Key Weaknesses in the Graduate Program Identified by Faculty and Graduate Students:

- Structure of course sequence needs improvement, and there needs to be more application in coursework. Alternate year course scheduling needs to be minimized.
- Lack of clear exit points for students experiencing difficulty.
- Budget cuts—need more resources in the operating budget.
- Graduate student stipends/fees/fringe are too low – not paying them enough to be competitive with other institutions.
- Need more policy/environmental law/public choice courses.
- Lack of student preparation in the quantitative area.
- Need a master's level dynamics course.
- Need more natural science/oceanography courses.
- Lack of courses on production economics, risk, and uncertainty.

C. Teaching:

Undergraduate Program

The undergraduate program has the potential to emerge as a stand-alone major and as a joint program in cooperation with other departments, such as the Environmental Economics and Management major coordinated with NRS. There have been several limitations in expanding these programs, including: poor communication with prospective students; strategic behavior resulting from the program contribution analysis; lack of undergraduate course offerings; and the over-commitment of faculty to other areas. Other areas, such as competing for research funding, funding the Coastal Institute Building and its equipment, graduate education, professional service, and outreach, yield a high return for URI.

Undergraduate Major Enrollment History 1995-2002

Program	1995-1996	1998-1999	1999-2000	2000-2001	2001-2002
Resource Economics and Commerce	11	13	9	7	7
Joint Major - Environmental Economics & Management	0	1	3	3	13
Total	11	14	12	10	20

D. Outreach:

Most ENRE faculty are actively involved with outreach activities, much of which does not receive formal recognition. Recent examples include:

- RI Legislative Committee on Aquaculture - James Anderson
- Herring Technical Committee, Atlantic States Marine Fisheries Commission - John Gates
- RI Rural Lands Committee - Robert Johnston & Stephen Swallow
- Advisor to Exeter, Middletown, and Portsmouth on growth management - Robert Johnston
- Board of Directors, Salt Pond Coalition - Marisa Mazzotta
- Social Science Advisory Committee, NE Fisheries Management Council - Jon Sutinen, John Gates
- Enforcement Committee, NE Fisheries Management Council - Jon Sutinen
- Richmond Rural Preservation Land Trust, Chair - Stephen Swallow
- RI Natural History Survey, Board of Advisors - Stephen Swallow
- South County Tourism Council - Timothy Tyrrell
- Blackstone Valley Tourism Council - Timothy Tyrrell

- Marine Stewardship Council (London), Senior Advisory Committee – Cathy Wessells
- National Advisory Committee to the U.S. Representative (The Honorable Carol Browner) to the North American Commission for Environmental Cooperation - Cathy Wessells
- RI Agricultural Land Preservation Commission - Dennis Wichelns

III. Goals

A. Overall

The overall goal of the Department of Environmental and Natural Resource Economics is to strengthen our position as an internationally recognized leader in the application of economics to study the use of environmental resources; especially coastal and marine resources, fisheries, water, and land. To do this, we must reverse the trend of attrition that we have suffered during most of the 1990s. We must find ways to reduce the current over-commitment of faculty and staff by building new capacity. Our goals, therefore, are to:

- Increase the number of tenure track faculty from 9 to 14.
- Increase our staff support from 1 to 2.
- Increase full-time computer programmers from 0 to 2.
- Streamline and reorganize the Master's program to attract 40 tuition-paying students.
- Strengthen our PhD and Master's programs with new courses and increased breadth and depth.
- Increase the awareness and visibility of our undergraduate program by correcting obvious omissions in the URI catalog, recruitment materials, and website.
- Increase program visibility and undergraduate course offerings which may increase undergraduate ENRE majors to 50 and joint majors to 100 by building capacity to offer a comprehensive set of attractive, issue-based courses.
- Utilize graduate students who want to build their teaching skills to increase the number of undergraduate course offerings. This change will benefit graduate and undergraduate students as well as the Department.
- Maintain funding in excess of $70,000/tenure-track faculty member/year. This amount is well above any social science standard.
- Identify and pursue private donors.

B. Research

The primary research goals are to ensure that the our strong international reputation in fisheries and marine resource economics is maintained and strengthened; establish leading programs in experimental economics and its uses in environmental policy analysis; strengthen our leading position in market and nonmarket valuation methods; establish strong research programs in ports and shipping, spatial policy analysis, economics of biotechnology, and the economics of public choice and institutions in natural resource management. To do this, we must:

- Increase the total number of new tenure track faculty by 5 over the next 10 years. Areas of expertise that need strengthening now or in the near future include:
    - Marine resource and fisheries economics, microeconomic theory, econometrics, bioeconomic modeling, experimental economics, law & economics, water and/or energy policy, market-based mechanisms, simulation and optimization techniques, renewable coastal and marine resources, aquaculture/biotechnology, biodiversity, natural resource management in the developing economies, invasive species, economic justice and wealth transfer, international trade.

C. Teaching

1. Graduate

In an effort to maintain our position as a leading graduate program in Environmental and Natural Resource Economics, to meet the growing need for marine resource economists (e.g. NMFS), and to strengthen the depth and breadth of our course offerings, we need to:

- Increase the total number of new tenure track faculty by 5 over the next 10 years.
- Increase full-time computer programmers from 0 to 2.
- Streamline and reorganize the Master's program to attract 40 tuition-paying students and decrease the time to graduation.
- Strengthen our PhD and Master's programs with new courses.
- Maintain the number of PhD students at approximately 20.
- Create short certificate programs to attract professionals already established in the workplace to upgrade their skills.

2. Undergraduate

Our goals for the undergraduate program are:

- Increase ENRE majors to 40 as Department resources improve.
- Increase the number of students in joint majors with NRS, FAVS, or others to 100.
- Add at least four new undergraduate course offerings.
- Communicate the merits of the program more effectively to potential applicants, incoming students, University College, and recruiters.
- Help the administration evaluate and revise the "program contribution analysis" system.

D. Outreach

ENRE is highly productive and its products are extremely practical. Its research output, as described above, compares favorably with the best in the University. The faculty is highly supportive of outreach efforts and is enthusiastic about the transfer of economic "technology" to the solution of problems related to the State's environment and natural resources. However, at present only a small portion of one faculty member's time is formally allocated to Outreach through CES, and this time is allocated to a specific program of technical assistance to communities and state economic development agencies. In general, the faculty has not allocated

a significant amount of time to the process of making available and promoting the results of their research to broader local constituencies. Our goal is to conduct self-examination of our potential for increasing local outreach, subject to resource constraints, and design a program to achieve the greatest improvement.

IV. The Plan

A. Gap Analysis: Research

Competing programs are scaling up at the University of Connecticut (UCONN) (currently hiring a resource economist), Harvard (started a graduate program in environmental economics this year), Duke (hired a marine resource economist this year and has another position open), U of Maryland (has two open positions), UC Santa Barbara (the Environmental Sciences Mgmt. program is hiring resource economists), and William & Mary/VIMS (hired a marine resource economist last year). ENRE has at least three fewer tenure-track faculty than our weakest competitor (UCONN). We cannot afford to continue to lose any more ground relative to our competitors. ENRE's position in fisheries economics (our traditional strength) has been weakened by the promotion of Cathy Wessells to the Dean's Office and the reassignment of James Anderson to chair. It is likely to be further weakened by the probable retirement of the remaining fisheries economists within the decade. In addition, there are no junior fisheries faculty. In general, the Department has a disproportionate amount of senior faculty, a result of the contraction throughout the 1990s. As noted, we have several areas of emerging and potential strengths, but they will not be realized if we do not build capacity on the existing foundation of faculty and staff. The success of the SimLab and our leadership in experimental economics applied to environmental issues also depends on capacity building in personnel. To be competitive we must:

- Rebuild personnel to the level required for a sustainable, high-quality undergraduate and graduate teaching, research, and outreach program: 14 tenure-track faculty, 2 support staff, and 2 computer programmers.
- Identify and pursue private donors to support both the building and faculty positions.
- Attract graduate students who are better prepared.
- Increase the role of associate researchers/scientists in our research programs.
- Attract more visiting professors.
- Continue to maintain our presence at professional meetings and in the literature.

B. Gap Analysis: Teaching

1. Graduate:

As previously noted, competing graduate programs are growing. URI is losing both undergraduate and graduate students to these up-and-coming programs. Our greatest limitations are in the organization of our course sequence at the Master's level, not enough faculty to teach a wide array of course offerings, the quality of incoming students, and the shortage of domestic applicants. An important weakness is that we are required to teach economic theory and econometrics courses that our competitors teach in their Economics Departments. Our Economics Department does not teach these courses because its graduate program was eliminated in the early 1990s. This flaw hampers our reputation.

- The first and foremost step is to revitalize the faculty and course offerings with new faculty. To be realistically competitive, we need at least two positions over the next two years. To maintain our position as a top program, we need to have at least five additional positions.
- Second, we must reorganize our Master's program so that well-prepared students are realistically expected to finish in three semesters, or at least four. If we do this, it is expected that our Master's enrollment will shift to primarily students paying full tuition, and enrollment will more than double--from about 15 to over 40. We will attract more quality students who don't want to spend five or six semesters pursuing a Master's degree. This is clearly an area with potentially high return for the University.
- Third, we need to enhance our course offerings to include: Public Choice Theory, Decision Theory, Simulation, Complex System Modeling, Operations Research, Energy Economics, Water Use, Nonrenewable Resources, more Risk and Uncertainty, Law and Economics, more experiential learning though better integration of decision-makers outside the University, and actual field experience.
- Fourth, we must increase graduate stipends and strive for tuition *and* fee waivers for grant-funded students in order to attract a larger number of high-quality students.

2. Undergraduate:

After spending considerable time evaluating the causes of the relatively low enrollment in CELS and ENRE, there are several obvious areas where the University falls far short, contributing to lackluster undergraduate enrollment. Some shortcomings:

- *US News and World Report* ranks URI in the third tier. Our competitors are ranked much higher. Among public universities, U Delaware is ranked 24th, UCONN is ranked 28th , U Vermont and UNH are tied for 44th, and UMASS is ranked 48th.
- URI is not even listed in Kiplinger's *Best 100 Public Universities* (www.kiplinger.com). UMASS, UCONN, UMaine, UNH, and UVermont are.
- URI is not even listed in several college evaluation publications, such as the *Templeton Foundation College Guide* (www.collegeandcharacter.org); *The New Ranking of American Colleges* (http//collegeadmissions.tripod.com); *Choosing the Right College (ISI)*; *National College Search: College Rankings* (www.nationalcollegesearch.net); and *The Most Wired Universities*.
- URI recruiting targets largely urban or high-density suburban high schools. The students that are interested in URI's strengths (coastal, environmental, and marine programs) are more likely to come from rural and low-density suburban high schools.
- URI does not effectively recruit at local high schools, and there is a lack of institutional effort to develop cooperative programs for seniors in the local schools.
- On a new internet site developed and run by MIT students (www.studentsreview.com), current URI students rated the Education Quality (C-) and the Campus (F).
- In discussions with local high school seniors, two wanted to study fisheries and marine biology. One student was applying to UMiami and UMASS; the other was applying to Occidental and UCONN. URI was the school of last resort. One URI graduating senior said they came to URI for fisheries, but if they were applying now, they would have gone to UCONN because of their facility at Avery Point, even though URI has a much stronger fisheries faculty. URI has been and still is poor at communicating our strengths.
- URI's ill-conceived "program contribution analysis" is biased against science and more difficult courses, creates incentives for advisers to recommend their own Department's courses, undermines cross-disciplinary program development, and inhibits emerging

programs. Since the adoption of the "program contribution analysis," there has been a noticeable decline in students from Economics, Business, and Marine Affairs taking ENRE courses.

- In the *URI Viewbook 2001-2002,* our College is not well represented; the Department of Environmental and Natural Resource Economics is essentially nonexistent.
- The situation for ENRE is worse in the *URI Catalog*. There are no listings under ENRE in the "Courses of Instruction" section. All the courses are listed under Resource Economics with no obvious connection or cross reference to ENRE.
- Worst of all, on the URI website pages for course registration, there is no obvious way to find ENRE courses. There is no listing of Environmental and Natural Resource Economics under the menu for "Course Discipline;" instead, ENRE's courses are under Resource Economics with no cross reference.
- Students have told us that ENRE courses (when they are finally identified and taken) are generally more difficult than other social science courses at URI, at least they are perceived that way. Unfortunately, this is symptomatic of many of the students enrolled in the "popular" majors, where one can graduate with no computer skills (except word processing), 6th grade math skills, and no substantive knowledge of economics, history, or natural science. This "dumbing down" of students at URI reduces the pool of qualified students for ENRE courses.

We clearly have a failure to communicate to current and incoming students and the counselors in University College as to the interesting and valuable courses in our College and in ENRE. The plan, therefore, is to:

- Correct the URI catalog and website problems.
- Increase ENRE's presence in the *URI Viewbook.*
- Encourage the Undergraduate Admissions Office to do a better job. If our Admissions material does not play to the appropriate audience for URI's traditional strengths in coastal, environmental, marine, and ocean studies, and develop a little more stature in URI among RI high school students, URI will continue to lose students to UMASS, UCONN, and others.
- Participate in the creation of a minor in "Sustainable Economic Communities."

- Continue to pursue joint majors, such as our new joint major with NRS, FAVS, and other programs. However, efforts at the Department level will have little or no effect on the overall undergraduate enrollment problem at the University. Rather, departmental efforts primarily fight to take students from other programs, effectively obtaining a bigger piece of a fixed pie. The University does not benefit from this incentive structure.
- Add new courses as capacity is increased, such as the following (most of which are currently offered by our competitors):

    - Using PCs in Resource Economics
    - Managerial Economics
    - Industrial Organization and Natural Resources
    - Analysis of Environmental Policy
    - Energy Economics
    - Natural Resource Management in Developing Countries
    - The World's Natural Resource Distribution Systems
    - Economics of Exhaustible Resources
    - Natural Resource Commodity Futures and Options

C. Gap Analysis: Outreach

Virtually all of the ENRE faculty have active outreach programs with state agencies, RI towns, legislative committees, national and international committees, fishing industry associations, fisheries management councils, and private citizens. This outreach is a logical spinoff of ENRE's high-quality and highly applied research efforts. The limiting factors are time, staffing level, and the lack of recognition within the University.

To enhance ENRE's outreach we must:

- Increase the proportion of faculty with cooperative extension (CE) appointments.
- Identify an Outreach Coordinator with the responsibility to promote and encourage current outreach efforts and identify additional research products that can be translated for State and regional audiences.
- Replace faculty lost through the 1990s; the more we produce high-quality research, the more government agencies, firms, and individuals will seek our advice.
- Formalize recognition within the University structure. If the "program contribution analysis" is to remain the dominant evaluation tool, outreach will suffer.

D. Timeline

Current:

Tenure Track Faculty	9
Computer Support/Programmers	0.1
Office Staff	1
Research Associates/Scientists	2
Visiting Faculty	2
Graduate Students: PhD	24
Graduate Students: MS	11
Undergraduate: REC	7
Undergraduate: EEM	13
Grants	Approx. $75,000/faculty member/year

Year 1:

1) Fill Cathy Wessells' vacancy, emphasizing marine resources, fisheries or trade, econometrics, or bioeconomic modeling. This position is absolutely essential to offering our graduate-level econometrics course. ENRE has made a commitment to the important and growing area of marine resource economics, international trade, and the environment. This topic attracts students and grants. We need to continue to develop strength here.
2) Reorganize the Graduate course sequence to reduce alternate year course offerings.
3) Improve the website and correct errors in the URI catalog.
4) Fill the computer programmer position to primarily support the SimLab.
5) Work on developing a shared major with FAVS and seek greater cooperation with Marine Affairs.
6) Attempt to identify private donors to support ENRE and the SimLab.
7) Work with the National Fisheries Institute and the National Marine Fisheries Service to help promote the program and develop internships.
8) Add an introductory course using experimental economics and the SimLab to teach resource economics principles.
9) Complete Outreach self-exam and design an Outreach Program for the Department.

Tenure Track Faculty	10
Computer Support/Programmers	1
Office Staff	2
Research Associates/Scientists	2
Visiting Faculty	2
Graduate Students: PhD	22
Graduate Students: MS	15
Undergraduate: REC	10
Undergraduate: EEM	25
Grants	$70,000/faculty member/year

Year 2:

1) Fill a new position in Environmental & Resource Economics emphasizing microeconomic theory, industrial organization, law and economics, or public choice theory. Natural resource use is very much influenced by the structure of the industry. If there are many small companies, the results will differ from the case where the industry is dominated by a monopoly or cooperatives. The industrial organization of natural resource sectors ranges from local ownership to multinational companies, and through mergers and acquisitions the sectors are rapidly changing. We are weak in this critical area, and it is a great area for SimLab use.
2) Implement a reorganized Master's program that facilitates students completing the program in four semesters.
3) Develop new graduate program information and recruiting materials for a major recruitment effort.
4) Create short certificate programs to attract professionals already established in the workplace to upgrade their skills.
5) Adopt a reformulated Outreach Program.

Tenure Track Faculty	11
Computer Support/Programmers	2
Office Staff:	2
Research Associates/Scientists	2
Visiting Faculty	2
Graduate Students: PhD	22
Graduate Students: MS	20
Undergraduate: REC	15
Undergraduate: EEM	40
Grants	Approx. $70,000/faculty member/year

By Year 5:

1) Fill new position in Environmental & Resource Economics emphasizing simulation and optimization techniques, experimental economics, renewable coastal and marine resources, aquaculture/biotechnology, and biodiversity. The role of biotechnology is only going to increase in the future. If it is to move beyond the lab, there is a need to apply economics to evaluate the tradeoffs made when adopting new technology. ENRE needs more capability in evaluating risk and uncertainty associated with new biotechnology and/or the decisions which influence biodiversity.
2) Fill a new (or replacement) position in natural resource management in developing economies. ENRE attracts many students from developing economies, and most of our domestic students have a strong interest in how resources are used in these countries. Policies and institutions in developed and developing economies are becoming increasingly interlinked and so is the sustainability of the communities. Some examples: US consumption of oil has had a profound, and not necessarily positive, effect on both the US and countries in the Middle East; attempts by US environmentalists to protect elephants influence poverty in Africa; and US policy on marine turtles has influence on shrimp producers in Thailand. Conflicts often distill down to an issue of natural resource use, allocation, and control. Environmental justice, fairness, and equity are of increasing importance. ENRE needs more strength in these areas to attract students and to serve the global community.
3) Secure tuition and fee waivers for grant-funded graduate students.
4) Enroll 20 tuition-paying Master's students.
5) Reevaluate the ENRE outreach program.

Tenure Track Faculty	12
Computer Support/Programmers	2
Office Staff	2
Research Associates/Scientist	3
Visiting Faculty	2
Graduate Students: PhD	20
Graduate Students: MS	30
Undergraduate: REC	35
Undergraduate: EEM/other jt. major	80
Grants	$75,000/faculty member/year

By Year 10:

Tenure Track Faculty	14
Computer Support/Programmers	2
Office Staff	2
Research Associates/Scientist	4
Visiting Faculty	3
Graduate Students: PhD	22
Graduate Students: MS	40
Undergraduate: REC	40
Undergraduate: EEM/other jt. Major	100
Grants	$75,000/faculty member/year