Nicholas School of the Environment

Strategic Plan—2000

Executive Summary

I. Our Aspirations

The Nicholas School strives to be the World’s leading interdisciplinary environmental program combining resources from the biological, physical and social sciences. It will develop centers of excellence in:

- **Ecology**—terrestrial, aquatic and marine ecosystems, including biodiversity conservation and the biological dimensions of global change;

- **Environmental Quality and Health**—air and water quality and its connections to human health;

- **Earth and Ocean Sciences**—climate change, surficial processes and solid earth dynamics;

- **Environmental Social Sciences**—the economic and political dynamics that shape environmental policy and institutions.

We will provide the highest quality integrated educational programs at the undergraduate, professional graduate (MEM/MF) and academic graduate (Ph.D.) levels; In addition, we will provide programs of post-graduate education and outreach that take advantage of the latest advances in information and communications technology.

We will pursue these goals with a commitment to:

- *The union of basic scholarship and education to their real-world applications.*

- Interdisciplinary Collaboration.

- Objective and Quantitative Approaches to Problem Solving.

- *Principles of Environmental Integrity and Sustainable Utilization of Natural Resources.*

- *A Global Perspective.*

- Education Across the Curriculum.

- Excellence.

II. Our Environment—a World of Change
A. Changing issues. A decade ago, when the Nicholas School was inaugurated, environment had ceased to be a fringe issue. American society was beginning to recognize the benefits and the conflicts generated by the environmental legislation enacted in the early 1970s. Public policy debate on such matters as toxic clean up or restoration of failing fisheries was not so much about whether there was a problem, but whether and to what extent remediation should be incentive based or by regulatory command and control. Climate change was largely a matter of academic speculation among those impressed with the possible influence in the increased injection of carbon dioxide into our atmosphere from the burning of fossil fuels and the loss of forests. These issues remain, but new ones have arisen including:

- **Economic and environmental globalization.** The boundaries that once constrained the flows of money, natural resources, organisms and pollutants have changed, and in many cases, been eliminated.
- **Boundaries.** Where boundaries once separated areas of interests, they have become the central objects of interest.
- **Environmental equity and the conflict of among human values.** We have come to understand that seemingly benign actions at relatively small scales are magnified through the actions of many to have large-scale negative consequences.
- **The linkage of environmental and human health.** The risks to human health presented by air and water pollution have long been understood, but the relationship between the integrity and health of ecosystems and a wide array of human diseases and ailments is now receiving expanded attention.

- **Biocomplexity.** Biodiversity—the variety of life on earth—has been and continues to be a matter of environmental interest and concern. The term "biocomplexity" is intended to focus on the interactions among that variety over scales of space and time.
- **Technology as an agent of change.** Technological change has driven much environmental change; witness the impacts of the internal combustion engine, hydroelectric turbine, and the atomic reactor. Technology is also changing the tools available to study and mitigate environmental challenges.

One might identify other areas, but these serve to illuminate important trends within key disciplines (environmental economics, ecology, toxicology and earth science). Each one begs for an integrated systems perspective, for a variety of interdisciplinary collaborations and for attention to issues of spatial and temporal scale. We must think globally and over long time spans, but with a firm understanding of place and the here and now.

B. Changing Competition. In 1991, only a few institutions had developed comprehensive programs similar to the Nicholas School in composition and mission. Most notable among these were the School of Forestry and Environmental Studies at Yale, the School of Natural Resources and Environment at Michigan, the School of Public and Environmental Affairs at Indiana, and the College of Environmental Science and Forestry at SUNY-Syracuse. In the years since, the list of such programs has grown. Unlike the Nicholas School, none of these comprehensive programs includes major
activities in earth, ocean, or atmospheric sciences. From a scholarly standpoint, our competitive environment is best evaluated with regard to the particular intellectual areas within which we aim to develop and maintain centers of excellence.

- **Ecology.** The last National Research Council evaluation placed Duke third in the country in this area. The recent inauguration of the University Graduate Program in Ecology created a unified identity for Duke Ecology. The strongest competition for this program comes from Stanford, Princeton, University of Wisconsin, University of Georgia and University of California, Santa Barbara. In particular sub-disciplines Virginia, Michigan and Minnesota are important.

- **Environmental Quality and Health.** Elements of this area are well developed in Schools of Public Health (for example UNC-Chapel Hill) and departments of pharmacology and toxicology at several universities. Very few programs have explicitly focused on the connections between ecosystem and human health; e.g., none of the Nicholas School’s traditional competitors—e.g., Yale, Michigan, UCSB—have programs in this area.

- **Earth and Ocean Sciences.** The array of programs in this area is quite large and growing as many programs shift from a more traditional geology emphasis to include a broader array of environmental disciplines. Comprehensive programs under this banner at Stanford, Columbia, and Harvard are nearly as large as the entire School of the Environment. Key competitors vary among the core areas that we have selected as priorities.

- **Environmental Social Sciences.** Duke University was ranked 3rd among major universities in a recent U.S. News and World Report poll in the area of environmental policy. Our chief competitors include UC-Berkeley, University of Maryland, Harvard (The Kennedy School), Yale and Michigan. This is an area where modest growth coupled with the establishment of the emerging Center for Environmental Solutions provides an opportunity for Duke to become the undisputed leader.

**C. Changing Environment at Duke.** The past decade has seen significant change in the agendas and curricula in the University’s college and several schools. More generally, any doubts about the importance of interdisciplinary collaborations, globalization and technological change have evaporated, and strategic approaches in each of these areas are being articulated with increasing clarity. There have been a number of more specific changes within Duke, many in response to these key areas.

- Increased availability of central resources (i.e., at the level of the Provost and President) to fund University-wide priorities. These priorities have included the strengthening of engineering and the sciences, interdisciplinary collaborations across school boundaries, new initiatives and entrepreneurial opportunities.

- Increased commitment to technological development as evidenced by investment in information and communication hardware and connectivity.

- Changes in priorities and organization of other Duke units. Environment has increased in importance for each of Duke’s schools creating ever-increasing opportunities and responsibility for collaboration. Notable...
among these changes are the reorganization of the former Botany and Zoology departments into a single department of Biology, and changes in faculty programs and environmental interests in Medicine, Engineering, Law and Business.

- Changes in undergraduate curricula. The implementation of Curriculum 2000 will increase opportunities for Nicholas School faculty to participate in undergraduate education.
- Changes in resources. The ongoing Capital Campaign has already generated important incremental resources (restricted and unrestricted) at the level of the School and the University.

III. Our Goals and Major Initiatives

**A. Faculty Development.** It is the faculty, more than any other attribute, that determines the quality and notoriety of a program. During its first ten years, the Nicholas School made significant progress in building faculty quality in each of its priority areas. In the years ahead, we will build on that progress to place the Nicholas School and Duke University faculty among the premier environmental programs in the world.

To achieve this goal we will:

- Increase the size of our faculty by as much as 15% (from 40 to 46 tenure-track positions), paying particular attention to the needs of educational programs, opportunities to leverage against existing strengths, and taking advantage of intra- and inter-school linkages. The actual level of faculty growth must depend on the success of our educational initiatives.
- Focus all faculty development in the priority areas outlined above;
- Take advantage of opportunities such as the Black Faculty Initiative to increase the diversity of our faculty, particularly with respect to African American scholars.
- Implement improved programs for faculty mentoring and evaluation;
- Increase both the quality and amount of space for faculty programs;
- Seek additional support for interdisciplinary research initiatives, as well as seed and bridge funding for faculty research programs;
- Nurture student research as a key mechanism to link our research and education programs.

**B. Educational Programs.** The educational portfolio of the Nicholas School is diverse and includes undergraduate, professional masters, graduate (Ph.D.) and non-degree programs. The Nicholas School will be known within and outside Duke University for the quality of and innovation in each of these programs. Key strategies are discussed below in association with major educational programs.

Durham Campus Undergraduate

- Take advantage of new faculty and reallocate current faculty effort to development of new courses at the undergraduate level, with particular attention to the needs of Curriculum 2000.
• Develop and maintain the undergraduate majors co-administered with Trinity College of Arts and Sciences, with special attention to the inauguration of the new BS degree in Environmental Sciences.

Beaufort Campus Undergraduate

• Work closely with the Biology Department on scheduling and curricular issues to provide more incentives for participation by biology majors.

• Continue to explore new avenues for student recruitment at Duke and elsewhere.

• Continue development of innovative curricula focused on the "land-sea interface."

• Implement distance learning technologies—e.g., video conferencing—to provide opportunities for students on both campuses to access courses.

Professional Masters Programs

• Evaluation and update of curriculum to keep pace with a very dynamic field.

• Decrease size of the on-campus student body to ensure the highest quality matriculant pool in the context of change in the applicant pool.

• Reorganize program tracks with special attention to minimizing overlap among tracks and changing career opportunities.

• Re-evaluation of financial aid policies in order to optimize the impact of aid on the quality and diversity of the student body.

• Continued integration of new technologies across the curriculum.

• Strengthen and diversify joint degree offerings.

• Develop and launch the Global Environmental Leadership Program (GEL), the nation’s first off-campus/distance learning professional environmental masters program.

Graduate (MS and PhD) Programs

• Evaluate opportunities for reorganization of the School’s graduate programs in light of the governance changes and the creation of the new University Program in Ecology.

• Regularize teaching assistant opportunities across the School to assure equity and to take advantage of changes in the undergraduate and professional curricula.

• Upgrade web sites and other communication materials to increase student interest in Nicholas School programs with particular emphasis on new
areas of development and programs of younger faculty.

- Increase incentives for faculty to incorporate research assistantships in extramural grants and for students to pursue extramural fellowship (NIH, NSF, NASA, DOE, etc.) opportunities.
- Seek funding for graduate endowments to recruit the most promising applicants.

C. Space, Information Technology and Facilities. Current space is inadequate in both quantity and quality to meet our aspirations for growth and development as outlined in earlier sections. Furthermore, separation of faculty at different locations (Beaufort, Old Chemistry and the LSRC) has been identified as a major impediment to collaboration in teaching and research.

Facilities support—e.g., information technology, instrumentation and teaching facilities—varies in quality. The demands for state-of-the-art information technologies are high across the School. Research and teaching applications include spatial analysis, Geographic Information Systems (GIS), satellite remote sensing and simulation modeling. Educational demands for these technologies will increase dramatically in the near future as student needs and expectations for undergraduate and graduate programs rise, and to meet the needs of proposed non-traditional programs that will depend heavily on distance and web-based learning. Classrooms in each of the School’s locations are poorly designed to meet these technological changes. The soon-to-be-built Ocean Sciences Teaching Center will provide relief at the Marine Laboratory. However, significant needs remain in the Old Chemistry building and the LSRC. Faculty growth as well as changing demands for analytical tools require that the School accept more responsibility for purchase and maintenance of instrumentation in the future. To meet these challenges, we will:

- Develop plan for evaluation and allocation of space that acknowledges changes in program space needs and provides flexibility in space use and reassignment.
- Upgrade of classroom facilities in the LSRC with special attention to classroom design and needs for multimedia and information technologies;
- Create "signature endowments" to provide year-to-year funding for information technology development, educational innovations and faculty start-up costs;
- Create a capital budget formula to support depreciation of facilities, instrumentation and information technology;
- Develop of a master plan for space use at the Marine Laboratory (Pivers Island) that includes the completion of the Ocean Sciences Teaching Center, renovation and/or new dormitory space and accommodation of distance learning technologies:
- Explore architectural and financial feasibility for either acquiring additional existing space or the addition of a wing on the LSRC so that the all of the programs of the Nicholas School can be accommodated in a single space—new construction is not likely during this 5-year planning period;

D. Administration and Management. Over the past ten years, the Nicholas School has grown enormously in size and complexity and its budget has more than doubled. Furthermore, in the University as a whole central resource incentives, information technology (e.g., SAP and SISS), and management protocols have changed dramatically. Each of the schools is increasingly
entrepreneurial in its educational programs, research and fundraising. The administrative structure of the School must not only be consistent with these changes, but capable of taking advantage of them proactively and adapting to other inevitable changes in the future. To meet these challenges we will:

- Continue work with staff from Business and Finance, Facilities Management, etc. to ensure efficiency in its administration, with particular attention paid to duplication of efforts within the School or the University.
- Explore opportunities to shift management of core functions (e.g., auxiliaries, Beaufort properties, kitchen, etc.) to central administrative areas in the University.
- Create the professional staff position of Senior Associate Dean for Administration charged with the oversight and coordination of all the School's administrative functions.
- Develop and maintain a comprehensive database focused on the School's key objectives and measures of success.
- Evaluate the need for changes in the allocation of clerical and other support staff to individual divisions reporting to the chair in light of pending changes in divisional structure.

**E. Partnerships.** That the Nicholas School of the Environment is embedded in a great University is perhaps its greatest asset. Coupled with the resources from neighboring universities and the State of North Carolina, the School is in a position to use partnerships as a means to further its mission and its strategic goals. The Nicholas School is seen at Duke as an exemplar for interdisciplinary interactions, and it should continue to pursue opportunities to build linkages with other Duke programs. To create and enhance partnerships, we will

- Consider explicitly University-wide Programs (e.g., the Institute for Genome Science and Policy), School-based centers (e.g., the Duke University Wetland Center) and interschool programs (e.g., joint degree programs) in faculty development.
- Encourage and reward faculty involvement and to take advantage of opportunities to enhance its own programs of education and research.

IV. Our Measures of Success

With regard to each of these areas we will measure our success in the following ways

A. Faculty Development

- Increased scholarly impact as indicated by our visibility in the finest journals and other publishing venues;
- The quality of teaching and mentoring in our various educational programs;
- Incremental growth of our faculty (from 40 to 46 tenure-track positions) focused on strategic priorities for intellectual development;
- The quality of our graduate programs as indicated by our ability to attract and place the finest students.
B. Educational Programs

- The size and quality of the applicant and matriculant pools in each of these programs;
- The growth and diversification of our curricula at all levels, but particularly in the undergraduate and professional areas.
- The satisfaction of our students as indicated by their evaluations;
- The post-graduate success and placement of our alumni;
- The continued faculty commitment to innovation and change;

C. Space, Information Technology and Facilities

- The quality and quantity of space necessary to attract and retain the finest faculty and students;
- Satisfaction that teaching space and facilities are facilitating rather than constraining innovation;
- The establishment of clear policies and procedures for the allocation (and reallocation) of space use among programs;
- An aggressive and proactive plan for information technology hardware, software and support staff development focused on the future needs of the School's educational and research programs;
- The development of communications systems that provide the connectivity between the Beaufort and Durham campuses necessary for real-time video conferencing and transfer of large data sets;
- The implementation of a capital budgeting program to assure our ability to keep pace with technological change.

D. Administration and Management

- Partnership with the Dean and faculty leadership in identifying and seizing strategic opportunities for the school in program development, resource generation and effective resource management.
- Monitoring and data management of key performance measures (e.g., faculty performance, grants, expenditures, etc.) so as to provide a clear and timely understanding of our overall position relative to key goals;
- Attracting and retaining the finest professional and support staff, and the high quality of their performance;
- High customer (faculty, student, university constituencies) satisfaction;
- Effective integration of information technologies into administrative functions.

E. Partnerships

- The School’s participation in and facilitation of collaborative research programs with other Duke units and with programs outside Duke;
- The participation of Nicholas School faculty (via secondary appointments) in other Duke units and participation of faculty from across Duke in the life
of the Nicholas School;
- The School’s success in attracting funding for interdisciplinary centers;
- Increased numbers of courses taught collaboratively by Nicholas School and other Duke faculty;
- Increased quality and growth of joint degree programs linking the Nicholas School to other Duke Schools

V. Our Financial Plan

Over the past decade, the budget of the Nicholas School has grown enormously in size and complexity, reflecting changes in the size and complexity of the School’s programs and mission. The boundaries among the three historic budget centers (LSRC, Old Chemistry and the Marine Lab) are becoming increasingly blurred with increased collaboration in teaching and research among these units, and this trend will accelerate in the next few years. The School’s endowment has grown to over $80 million (market value 30 June 2000), and endowment income will increase significantly over the next few years.

Several of the programs and initiatives outlined in this strategic plan will influence the expenditure and/or the revenue side of the School’s budget. These include:

Expenditures

- Faculty growth. Our plan proposes up to a 15% growth in our tenure-track faculty—i.e., six incremental positions—in areas important to educational programs, scholarly development and linkage to other university programs. Whether this amount or any amount of growth is appropriate depends heavily on our success in the development of key educational initiatives and meeting goals for research programs.
- Administrative support. Additional staff support is critical to meet the needs of a growing faculty and implementation of new programs such as GEL. In addition, the School must bolster its staff expertise in information technology.
- Capital needs include the regular replacement of computer hardware and software and the instrumentation needed for teaching and research. Such replacement funding has been included as a formal budget line.
- Additional support for student scholarships, fellowships and internships will be required if we wish to remain competitive in our professional and graduate programs.
- Operational reserves. The School will manage its budget so as to develop a minimum $1 million reserve to back stop operating risks (principally variations in ICRs and enrollement); with any excess funding available for periodic investment in infrastructure needs, faculty development and seed money for new initiatives.

Revenues

- Endowment income. The value of the School’s restricted and unrestricted
endowments has reached $83M. Income will provide invaluable support for faculty chairs, student aid and other specific programs. We can anticipate considerable growth in these endowments as we complete our portion of the capital campaign. These funds will be especially critical for faculty development and student support.

- Changes in endowment spending policy provides the dean additional discretionary income for strategic initiatives.
- A 20% increase in support from Trinity College of Arts and Sciences to the Nicholas School will fund our increased participation in undergraduate education with particular emphasis on the needs of Curriculum 2000.
- A 60% increase in undergraduate tuition at the Marine Laboratory over five years owing to increased recruiting effort and collaboration with the Biology Department.
- 15% decrease in revenues from on-campus professional masters students owing to a re-sizing of the student body to 200 students.
- Creation of the new Global Environmental Leadership program and additional partnerships with the Pratt School could generate an additional $1.2 million in revenue annually.
- Faculty development will result in increased revenues from grant indirect cost recovery.
- Additional development associated with the Capital Campaign will increase revenues to the Nicholas School Annual Fund.
- Investment from central funds will provide the "venture capital" needed to launch new programs and start-up new faculty during this five-year period.

Over the five year span of this program, we anticipate the annual budget (including restricted accounts or competitive grants) of the Nicholas School growing from its current $21 million to over $30 million. Importantly, this financial plan will include funding for the School’s future needs for information technology and the creation of an appropriate reserve fund.

To realize our long-term ambitions, the Nicholas School will need to make significant capital investments in its various facilities. The Ocean Sciences Teaching Center will be completed on the Beaufort campus, and additional space demands must be evaluated. These include the restoration of dormitory space lost to hurricane damage, renovation of research space, and management of properties in the town of Beaufort. These programs will be pursued in connection with plans for undergraduate program growth and expansion of faculty research programs. We can anticipate needs for space renovation on the Durham campus to upgrade classrooms and meet the needs of new faculty programs. Some of these needs can be met through "venture" funds aimed at our strategic priorities, and others will need to be priorities in the final stages of our capital campaign.

The Nicholas School’s original goal within the Campaign for Duke was $55 million, and we have raised nearly $45 million toward that goal to date. We expect that number to exceed $50 million by the end of this academic year. Much has changed since that goal was set, including the incorporation of the division of Earth and Ocean Sciences in the School (increasing the size and breadth of our programs), demands for new and better space and the expanding demands for a variety of information and communication technologies. We clearly have the capacity and ability to exceed that original goal, and these important changes certainly justify such a change. Thus, we propose to increase
our campaign goal to $60 million, with a particular focus on venture support for new initiatives such as the GEL program, "venture endowments" to provide ongoing support for innovative educational initiatives, faculty start-up, boat operations and technological needs and support for capital improvements such as the renovation of classrooms and research laboratories.