

What is environmental studies?

Although precedents existed for environmental studies programs in schools of forestry and natural resources, colleges and universities did not begin to initiate free-standing programs in the field until the 1960s. But even as environmental programs evolved and diversified, a definition of environmental studies and clear statements about curricular content and educational objectives have remained elusive. Now that environmental studies, as a specific curricular emphasis, is more than a quarter century old and is in a new phase of proliferation and expansion, the need for a distinct identity seems more pressing, if only to help to counter the hostility to environmental education from some political interests and to respond to charges that the field lacks rigor.

One current trend that is contributing to the indefinability of environmental studies is that of welcoming an increasing disciplinary diversity of faculty. In this article, we contend that this trend is causing crises of vision and curricular development, leading to both a paralysis of program planning and hyper-diverse, shallow curricula—"the environmental studies problem." We conclude that until the costs of universalism in environmental studies are recognized and understood, the field will not only remain indefinable but also become increasingly ineffective in its primary mission: to educate ecologically literate, responsible citizens who are problem solvers and agents of constructive social change. In addition, we explore a set of problems inherent in multi-disciplinary programs, and we recommend changes in the curriculum and the organization of environmental studies programs.

**Michael E. Soulé
and Daniel Press**

The origins and development of environmental studies

The roots of environmental studies can be traced to the turn of the century. The environmental politics of that era are usually portrayed as a conflict between two philosophies, conservation and preservation (Hays 1959, Nash 1967, Worster 1994), a conflict that continues today in the form of the polarity between anthropocentrism and ecocentrism.

Conservation originally meant pragmatic husbanding of natural resources, using the best science of the day and the mechanisms of government (legislation, management, and enforcement) to achieve these ends. This definition of conservation was championed by Gifford Pinchot (1865–1946), the first chief of the US Forest Service, and John Wesley Powell (1834–1902), the first director of the US Geological Survey. Part of their legacy was to institutionalize schools of forestry, fisheries, and wildlife management in most land grant colleges (Williams 1989), and their views dominated higher education in natural resources and the environment until the 1960s.

John Muir (1838–1914), of the Sierra Club, and Robert Marshall (1901–1939), of the Wilderness Society, were among the early preservationists. Their vision was to set aside the most magnificent, scenic lands in national parks, securing them forever from commercial exploitation. Later, Aldo Leopold (1887–1948) attempted to bridge the conservationist and preservationist philosophies by advocating a more comprehensive definition of resources and a more ecological system of values.

Until relatively recently, environmental education continued to focus on prudent use of natural resources. A 1957 study entitled "Conserva-

tion Education in American Colleges" (Lively and Preiss 1957) found that some 53% of the institutions surveyed taught "some conservation" but that these courses emphasized resource (utilitarian) philosophy, focusing on soil and water science, forestry, ecology, and economics.

Prompted in part by Rachel Carson's *Silent Spring* (1962) and its critics, the direction of environmental programs was transformed in the 1960s, shifting its gaze from natural resources and recreation to the effects of pollution on the health of wildlife and human beings. At this time, academia was entering a period of experimentation and growth. Students were demanding that the curricula of colleges and universities become more relevant to their social agendas, whereas a minority of faculty were determined to do something about the lack of environmental awareness and literacy in the majority of undergraduates. These two mutually reinforcing concerns, together with the mood of self-determination and rebellion created by the Civil Rights movement and the Vietnam War, all contributed to the rapid spread of environmental studies throughout the United States and Canada.

Most of the new environmental studies programs were started by physical and life scientists who were concerned with toxicological and epidemiological effects of pesticides and other pollutants, and by social scientists who were concerned with the emerging fields of environmental policy, policy analysis, and law. Resource economists examined the adequacy of the resource base to sustain economic development. Environmental studies was less a child of science or of a concern about the proper management of fisheries and forests than an eruption of concern about health, nature, and the quality of life—a social movement anchored in academia.

In these programs, professors and students joined forces to create a new area of academic emphasis that not only taught the basics and background of environmental problems but also directed the attention of students to issues of lifestyle and consumption that, cumulatively, have profound consequences for society and nature. For example, an awareness of the amount of waste produced by the harvesting and transformations of natural resources helped students to understand the web of economic, social, political, and ecological relationships in which they participated. The political implications of these programs—that is, their focus on the need for social change and on the methods for achieving such change—distinguished them from their management-oriented predecessors (e.g., Callicott 1980).

Environmental studies programs were pioneers in this rare era of academic experimentation, and ecology—the “subversive science” (Sears 1964, Shepard and McKinley 1969)—was often the centerpiece of the environmental studies curriculum. Textbooks and major sources included works by Eugene Odum (1971), George Woodwell (1970), Paul and Anne Ehrlich and John Holdren (1970), and Garret Hardin (1968).

By the 1970s, the courses listed in most environmental studies curricula depended on which faculty could be begged or borrowed from traditional departments. Faculties struggled to create a new synthesis crossing traditional disciplines as they groped with the issues of curricular coherence, rigor, and intellectual depth (Schoenfeld 1971, Schoenfeld and Disinger 1978). The end of this early phase in environmental studies program building saw most schools relying on one or more of the following areas: environmental science (with more or less emphasis on physical or life sciences and sometimes with an applied focus on sanitation, pollution, land use, and chemical hazards); environmental policy and planning (including economics, political science, and policy analysis); and cultural studies (with varying emphasis on American nature literature, environmental philosophy, cultural geography, and development studies).

Emerging themes, problems, and conflicts

A resurgence in environmental concern from the mid-1980s onward heralded the current era. Some themes have become virtually universal. One of these is complexity. Environmental problems are now recognized as belonging to a group of problems that resist purely scientific or technological understanding and solution: They are fractious, refractory, and expensive. And although environmental problems are salient to many people, salience does not necessarily translate into funding or political support for specific policies (Bosso 1996). Another theme that emerged was the relevance of scale (spatial and temporal) and context (ecological and cultural). For example, solutions to environmental problems that may be appropriate at the local scale (or within a particular culture) may be inappropriate at a national or international scale, or in another culture.

Although such themes have provided some identity to environmental studies programs, the growth of knowledge and the proliferation of new fields and emphases have exacerbated the lack of coherence in many curricula, sometimes causing a mushrooming, chaotic menu of unrelated courses, their numbers limited only by the size and energy of the faculty. Among the subjects added to the environmental studies curriculum in the last 15 years are the new fields of conservation biology, ecological economics, sustainable agriculture, development studies, conflict resolution, environmental justice, and environmental ethics. In addition, the need to understand global biophysical processes and global commerce and their environmental and social impacts has stimulated curricular growth. The trend is obvious: Environmental studies, as a field, is virtually limitless. Every aspect of the human economy and many aspects of culture affect the environment and are affected by it. Moreover, the absence of a consensus about the environmental studies canon militates against a logical basis for excluding course areas.

Environmental studies programs are bombarded with requests (and demands) by both students and fac-

ulty for new courses and curricular emphases. These entreaties, when considered individually, often appear to be reasonable. And even if the merits of particular proposals are questionable, faculty may be reluctant to demur, given their fear of offending some group or being labeled as elitist or non-egalitarian. The box on page 399 lists a sample of some of the many course areas that might be appropriate in particular environmental curricula.

Given that the intellectual landscape covered by environmental studies programs is potentially immense and that several new academic movements, such as deep ecology, political ecology, ecofeminism, and social deconstruction, have taken seats at the environmental studies table, it is inevitable that confusion and conflict are the result. Students already must cope with the complex nature of environmental problems; now, in addition, they are confronted by a spectrum of ideologies that promote conflicting problem definitions, analyses, and favored solutions.

Thus, it seems clear that as the number of fields claiming environmental relevance has increased, as several new ideological groups have been welcomed into these programs, and as the environmental studies curriculum has expanded with each disciplinary graft, the field has become increasingly chimeric. These issues—the confusion about disciplinary identity and the canon, the emergence of serious ideological conflict, and the institutional problems associated with applied, multidisciplinary programs in academia—must be resolved before there can be much progress in the field.

A discipline, multidiscipline, or interdisciplinary? Is environmental studies a discipline? A discipline, we contend, is a field that is either “vertical” and/or that has achieved agreement on its fundamental works—the canon. Vertical fields include science, economics, and math. In such fields, there is a consensus on the sequence of subjects (prerequisites) that build competence in a linear or hierarchical fashion, until students can grapple with “higher” topics. By contrast, horizontal fields, such as history or sociology, are less rigid in

Topics and subject areas that are often taught under the rubric of environmental studies

Agroecology	Fisheries science
Animal rights	Forestry
Anthropology (nature and culture)	Geographic information systems
Atmospheric sciences	Globalization and the environment
Bioregionalism	Hazard mitigation
Cartography/global information systems	Human demography
Conflict management and resolution	Hydrology
Conservation biology	Integrated pest management
Cultural ecology	International environmental law and policies
Development studies	Interview and survey methods
Ecofeminism	Landscape architecture
Ecological economics	Landscape ecology
Ecological engineering	Natural history
Ecology	Planning
Economics	Pollution chemistry
Energy resources assessment	Range management
Environmental economics	Recycling
Environmental education	Religion and the environment
Environmental ethics and philosophy	Restoration ecology
Environmental history	Risk assessment
Environmental interpretation	Rural sociology
Environmental justice and racism	Soil ecology
Environmental law	Sustainable agriculture
Environmental literature	Sustainable economic development
Environmental politics and policy	Sustainable exploitation of natural resources
Environmental psychology	Water policy
Environmental regulation	Watershed management
Environmental toxicology	Wildlife biology
Environmental writing	Wildlife management
Ethnobiology	

the sequencing of prerequisites and courses required for the major.

Is environmental studies vertical or horizontal? Brough (1992) points out that "problem-solving can founder if not supported by a solid intellectual framework in the classroom...[and] the framework underpinning environmental studies programs is science. Nearly all programs require a course or two in biology and other basic sciences as a prerequisite to taking advanced courses" (p. 28). However, such a short list of prerequisites, even if required universally by environmental studies programs, hardly suffices to qualify environmental studies as a discipline. We believe that environmental studies is a relatively horizontal field, although it contains subsets of verticality.

Does environmental studies have a canon? The identity of all disci-

plines relies in part on a consensus on the body of authoritative works that practitioners consider to be fundamental. When the canon becomes an arena of dispute, a field is flirting with fragmentation. Environmental studies did have a canon 20 years ago. For example, the works of Charles Darwin, Henry David Thoreau, and Aldo Leopold were then considered classics. These days, however, the attitudes expressed by these authors offend some faculty, illustrating the depth of ideological division among environmental studies faculty. We conclude, therefore, that environmental studies is further from disciplinary than ever.

If environmental studies is not a discipline, then what is it? We believe that environmental studies programs are multidisciplinary in their composition and often in their pedagogy but that many faculty should

strive for something more—that is, interdisciplinarity in outlook and method. In this regard, Braddock et al. (1994) emphasize the value of interactions among faculty in problem-solving projects, not just in the classroom. They suggest that interdisciplinarity is possible only "when there is sustained interaction on a formal and informal basis between members of different disciplines" (p. 39). This interaction is important not only because of its social benefits but also because it leads to new ways of thinking about complex issues.

An important reason for individuals to come together in an environmental studies program is so that they can develop into "interdisciplinary"—people who understand the languages of other disciplines and have learned to interact effectively and creatively with professionals in other fields. We note one

Table 1. The two major ideological groups in environmental studies and some defining characteristics.

Characteristic	Social Critics	Scientists/Empiricists
Values	Humanistic (anthropocentric); emancipation of human beings; holistic; sustainability of economic development	From ecocentric to anthropocentric; from protection of nature to sustainability of resources
Epistemology and methodology	Postpositivist or phenomenological; social deconstruction, employing culturally contextualized case studies	Hypothesis testing; seeks generalities; often reductionistic or Darwinian; systems oriented
Fundamental environmental problems	Access to land and land ownership; concentration of wealth in elites; social and environmental consequences of North-South economic imbalances; technological domination by elites; sustainable economics; environmental injustice	Loss of evolutionary lineages; loss of natural systems and biodiversity; the human population; unsustainable exploitation of natural resources; unsustainable economic growth; overconsumption; environmental degradation
Ultimate cause of environmental problems	Injustice and greed caused by political and economic repression	Greed caused by human nature; human hegemony of ecosystems
Environmental objectives	Critical skills; methods of social change; social ethic	Problem-solving skills; knowledge of natural systems and conservation ethics

caveat, however: Braddock et al. (1994) contend that “those who are apt to perform best in interdisciplinary settings are strong disciplinarians” (p. 39). If validated, this conclusion should give pause to those (like ourselves) who are developing doctorate programs in environmental studies.

Ideological conflicts. The problems of continuing curricular proliferation and of the lack of rigor have been aggravated by ideological tensions in environmental studies. Environmental studies programs traditionally welcome new faculty, regardless of their disciplinary origins, but we believe that this “open door” policy, as well as the recent trend to recruit faculty with heterogeneous epistemological loyalties and social goals, has led to confusion about mission and to the breakdown of collegial relations.

What are these conflicting fields? Academic fields can be subdivided endlessly, but for our purposes we lump the environmental specializations into two major categories (Table 1): social criticism and natural science (which includes some elements of political science and economics). Eckersley (1992) has examined

this issue in depth and presented a much finer classification, but our two groups are consistent with her analysis. We have excluded other ideologies from consideration. For example, mainstream neoclassical economists are rare in environmental studies programs, probably because the views held by these practitioners are incompatible with the dominant paradigms of the field. Another ideology, animal rights, has influenced the mores and behavior of many students and some faculty but is not a major force in the development of academic programs.

The first group, the social (or “postmodern”) critics, is largely humanistic, anthropocentric, and emancipatory (Eckersley 1992). Social critics often see the world, and teach about it, from the viewpoint of the human victims of discrimination and injustice. Their concept of the environmental problematique (Table 1) comprises issues such as access to land, land ownership policies that encourage concentration of wealth, and the social and environmental consequences of capitalism and North-South economic imbalances. These scholars favor social explanations (such as differential access of classes to power) for the unsustain-

able forms of exploitation and land use now dominating the world economy. Seeing little hope for incremental reform in many nations, they also tend to champion revolutionary political change and promote decision-making that is bottom-up rather than managerial, or top-down.

In addition, these scholars are deeply suspicious of pragmatism and incremental change, particularly when these are advocated by privileged elites. Instead, they favor revolutionary forms of social change, pointing out that scientists and activists working on issues such as species conservation or “industrial ecology” too readily assume Western or ecocentric views of nature and the economy—views that they regard as inappropriately narrow constructs for guiding public policy.

Social critics prefer intuitive, or deconstructive, methods over hypothesis-testing, reductionist methods (Lester and Stewart 1996). The search for underlying generalities or principles and for methodological repeatability are eschewed in favor of culturally contextualized, occasionally ethnographic case studies that question the cultural norms of Western civilization. Such scholars often attack scientists and technocrats as being narrowly “scientific” and “technist” and disparage modern science as an engine of the dominant, authoritarian culture.

The second major group—natural scientists—rarely equate intuition (or narrative) and knowledge. They also differ from the social critics in accepting the premise of evolutionary or incremental (rather than revolutionary) improvements in society. For example, natural scientists generally support the kinds of progressive environmental legislation that was adopted by the United States during the 1970s and 1980s. Moreover, many natural scientists, political scientists, and economists believe that environmental studies should teach students to be effective problem solvers and to master skills and research techniques to facilitate entry into careers and graduate school. These contrasting values and approaches often lead to miscommunication and tension among faculty members who have differing visions about the future directions of programs.

Disputes between these two groups are often formulated in terms of anthropocentric versus ecocentric goals and values, although these labels do not apply to all members of these groups. Anthropocentrists from both the left and right consider human welfare and economic advancement to have higher ethical standing than the welfare and existence of other species and ecosystems. Among those in environmental studies who are traditionally in the anthropocentric camp are sociologists, many anthropologists (those who emphasize sustainable development and poverty alleviation as environmental solutions), and many ecofeminists. Ad hominem attacks are common, with the humanistic social critics accusing the biologists of social naïveté, misanthropy, and racism. In response, ecocentric biologists accuse the humanists of "speciesism," ecological naïveté, and callousness toward living nature.

In contrast to the social critics, most ecocentrists reject the claims of absolute human privilege and rightful domination over nature. Although they are not attached to any particular social science theory of history or society, some admire the works of intrinsic value theorists such as Arne Naess, Holmes Rolston, and George Sessions. Ecocentrists advocate biodiversity, wilderness, and native plant and animal communities (ecosystems), including the services these provide society (e.g., Baskin 1997, Daily 1997). A premise shared by most ecocentrists is that the ultimate causes of environmental problems are either ancient human institutions (such as agriculture) or the genetic, evolved roots of human nature; they seek solutions that tacitly assume a universal, deep-seated impulse toward self-interest in all species, including human beings. In particular, ecocentrists frequently invoke the possibility that there is a genetic potential for greed or selfishness and that self-interest is resistant to cultural fixes or education. Hence, ecocentrists often question the theory, popular among social critics, that greed is simply learned. Because ecocentrists believe greed to be a fundamental part of human nature, they are less sanguine about the potential long-term benefits of revolu-

tions (which all too often replace one elite with another).

Given these differences in core beliefs, values, and methods, conflict among faculty in environmental studies is inevitable. One of the earliest, most persistent of these conflicts is the human population question. The debate about the causes and effects of population growth has tended to drive a wedge between the humanistic and ecocentric environmentalists. The objective of the former group has been to protect human health and welfare, including the sustainability of economic growth and of enterprises based on the exploitation of natural resources. By contrast, the ecocentrists have been more concerned with protecting living nature.

Hence, most ecologists have seen human population growth as the major driving force of biotic attrition and habitat destruction worldwide, and they have always supported universal access to family-planning services. Social critics, however (joined later by social deconstructionists), have usually pointed the finger instead at injustice, exploitation of workers, patriarchy, and inequity in land distribution and resources. Population growth, they claim, is a consequence of misguided economic and social policies—that is, it is more an effect of poverty and injustice than an independent forcing variable. These critics have argued that poverty and maldistribution of land and power, rather than reproductive behavior and family size, are the appropriate targets for social manipulation and economic change.

More or less simultaneously, another group of social scientists, the neoclassical economists, were arguing that substitutes for scarce natural resources can always be found, thereby rendering trivial problems such as degrading soils, depleted fisheries, denuded watersheds, and species extinction. Thus, the population issue remains the flash point of the "ecocentrism–anthropocentrism" dialogue (Soulé and Lease 1995), in part because the two groups have divergent "environmental" goals.

In some ways, however, ideological diversity has benefited environmental studies. The social sciences have revolutionized the manner in

which many environmental problems are addressed. It is now considered essential to incorporate analyses of institutional behavior, value differences, and socioeconomic disparities in access to justice and power. For example, most environmental practitioners, regardless of ideology, are now attentive to stakeholders and their participation in defining problems and prescribing solutions.

Nevertheless, there can be too much ideological diversity in a program, and there are better ways to accommodate and institutionalize multiple ideological perspectives than cramming them all into one unit. Although disciplinary and ideological diversity is desirable within the academy as a whole, we question the benefits of "hyper-diversity" within a single program or department, particularly if it creates chronic tensions and perennial stalemates about programmatic direction and produces an unwieldy, unfocused curriculum.

Institutional problems. Multidisciplinary programs are, in general, plagued by extrinsic or institutional handicaps. Although these problems may not appear to be immediately relevant to defining environmental studies, exploring them builds a context for our recommendations and conclusions.

Multidisciplinary is not the norm in colleges and universities, and traditional systems of academic resource allocation and rewards were not designed to sustain vigorous, integrative experiments in multidisciplinary. Issues of legitimacy erode the status of such programs. Cairns (1979) pointed out that attempts at new forms of academic integration are "vigorously resisted by much of the academic community, thus depriving both society and students of a holistic view." New ways of organizing teaching and research are often perceived as radical and threatening, particularly if there are fiscal implications for preexisting departments. Therefore, we doubt that environmental studies programs could exist in the traditional university without student demand.

A related institutional issue is autonomy. The vigor of multidisciplinary programs clearly depends to a great extent on their indepen-

dence within the institution. Programs that rely on ad hoc groups of faculty with different departmental loyalties or that are "stepchildren" within a disciplinary department are unlikely to be as successful as those that control their own budgets, recruit their own faculty, and manage their own promotion processes. A departmental structure also tends to minimize faculty turnover and provides a safer harbor for junior faculty, particularly if their research interests are applied, collaborative, or interdisciplinary. Autonomy appears to be greatest in cases where environmental studies programs have evolved within schools of forestry or natural resources management (e.g., at Yale University and at the University of Michigan).

Environmental studies programs are somewhat unorthodox in other ways. They often weigh criteria for tenure and promotion differently than traditional departments, in which individual intellectual performance gains the highest rewards. By contrast, environmental studies programs frequently give more weight to collaborative teaching and research and may consider community service as well.

The perception of heterodoxy is reinforced by the tendency of environmental studies programs to condone or even embrace activism. According to Orr (1992), a decent environmental studies program must make the leap from "I know, I care" to "I'll do something." Indeed, many students are motivated by causes such as animal rights, vegetarianism, endangered species, or the victimization of minorities. This idealism, however, can give rise to caricatures of environmental studies programs as "churches of the environment."

Finally, many scholars still maintain that applied research, let alone commitment to a cause, is *prima facie* evidence of bias, thus casting doubt on the significance of scholarship. The perception of subjectivity in environmental studies is pervasive, notwithstanding the existence of many other kinds of applied work within the academy, from schools of engineering, agriculture, and medicine to the contract military research performed in many "pure" disciplinary departments. The anti-establish-

ment nature of much environmental analysis, however, only underscores the perception of bias on the part of conservative critics, as manifested by the contemporary wave of anti-environmental propaganda, called the "brownlash" by Ehrlich and Ehrlich (1996).

Solutions for multi-disciplinary illiteracy

Given the above challenges of identity, curricular diversity, and questions about objectivity, it should be no surprise that there is widespread concern, both within and outside environmental studies programs, about the quality and rigor of the curriculum. Are the students receiving a sound undergraduate education? In our experience, many environmental studies students have only a superficial knowledge of any field, and the least probing exposes their ignorance. As educators, therefore, environmental studies faculty risk promoting what Swedish scholar Torsten Husén calls "multidisciplinary illiteracy." Another observer has commented that the subject matter of environmental studies is so broad and the pedagogy so shallow that students are sent into the world brandishing merely "the blunted lance of the well-rounded" (Nash 1977).

At least two general approaches for combating multidisciplinary illiteracy exist. The first approach is to build in disciplinary depth by imposing requirements in addition to specific coursework. Our preferred option is for all environmental studies programs to require students to take a second major in a traditional discipline. Alternatively, students could minor in a (disciplinary) field. A third solution is to require an honors-level senior thesis, so long as the work involved in this effort provides the same level of familiarity with a discipline to that usually obtained by majoring or minoring in that discipline. One drawback of this solution is that faculty must be prepared to devote many hours to supervising undergraduate research. Fourth, programs could require that students specialize in a particular area or "track" within the environmental studies major. However, in our experience this approach rarely pro-

vides for sufficient disciplinary grounding. A fifth solution is to eschew an environmental studies major altogether, offering instead a minor that complements a major in another field. However, this option is probably impractical for reasons of institutional traditions and politics: Programs or departments that offer only minors are less likely to be taken seriously, less likely to be funded, and less likely to attract student interest.

A second way to combat multidisciplinary illiteracy is to reexamine the objectives and content of the core curriculum. The core curriculum has always resisted definition and codification. A common solution has been to cobble together a set of courses that respects the faculty's diversity of experience, training, values, and worldviews. This opportunistic approach usually produces an unstable solution. Our own list of core essential topics—those that we believe will equip students to understand, analyze, and help solve environmental problems in an effective manner—includes ecology, political science, ecological and natural resource economics, environmental history, environmental policy, energy, pollution chemistry, environmental law, and environmental philosophy. We chose these particular topics to provide students with a common language and a sufficient depth of knowledge as grounding for further education and good citizenship. These core topics imply a set of educational objectives:

- Students should have a strong introduction to the modern, quantitative science of ecology. Ideally, they should master basic biology and basic chemistry before taking an ecology course. Such a course should be of equal or greater rigor to upper-division general ecology courses taught in a biology department.
- Students should understand the physics and chemistry of the atmosphere and hydrosphere and the processes contributing to the pollution and degradation of air, water, and soils. It is likely that more than one course would be necessary in these areas.
- Students should be able to use economic arguments effectively as

tools in solving environmental problems, and they should be able to articulate and critique the premises of neoclassical economics.

- Students should be familiar with the concepts of property, policy processes and tools, and the laws and regulations that affect land use, zoning, and the management of public and private lands. They should also learn how government institutions and the political milieu affect the natural environment.

- Students should be exposed directly to the natural world through field courses, internships, or involvement in interdisciplinary senior-level projects or faculty research.

- Students should have the opportunity to develop sufficient disciplinary depth to equip them for graduate school or for a career. Appropriate subject areas include conservation biology, ecological restoration, soil ecology, environmental policy, education, environmental toxicology, sustainable agriculture, planning, and environmental or ecological economics. Among the skills that could be mastered in particular programs are environmental risk assessment, basic policy analysis, natural history, ecological and sociological field research methods, statistics, geographic information systems and cartography, toxicology field and laboratory methods, hazard mitigation, interview and survey measurement, and econometrics.

These objectives alone, however, do not completely define a core curriculum. A core curriculum must also familiarize students with the history of the relevant disciplines and of environmental studies itself. In addition, students should develop enough critical acumen to detect the subtle messages and premises in rhetoric of all kinds. The core curriculum must also introduce students to problems of scale, cultural context, and complexity; students should learn, for instance, that environmental problems are multidimensional and that solutions that have worked in one context or scale will often fail in another. Hence, case studies and case histories are an essential component, not only because they are heuristic but also because there are few universals in this field.

We would add one more requirement, even if it is not, strictly speaking, a "core" curricular element: internships. Academic work alone is insufficient preparation for solving environmental problems and conflicts in the larger society because these issues are socially embedded, politically complex, and animated by individuals whose approaches to challenges may differ substantially from those of their academic mentors. For this reason, many environmental studies programs recommend internships. It is one thing to read, write, and talk about environmental problems, but it is another thing to experience them in a "real world," nonacademic setting. Furthermore, the opportunity to test one's theoretical knowledge can motivate further learning.

This list of objectives, limited though it may be, still covers a much broader intellectual territory than most disciplinary majors. Therefore, we believe that the core curriculum, its quality notwithstanding, is a necessary but insufficient response to the challenge of multidisciplinary illiteracy, at least within the limits of a four-year program. An adequate response must include one of the structural mechanisms described above, such as requiring a second major or minor.

Conclusions and recommendations

In response to the curricular and ideological hazards of universalism, we propose three internally coherent approaches to the study of the environment at the undergraduate level. Although only the first of these fulfills all of the educational objectives listed above, all three can constitute an integrated course of study.

Ecology and environmental policy analysis. This approach to environmental studies would combine applied biology and public policy analysis. It would require a solid background in science (similar to that required for a biology major), while emphasizing fields such as conservation biology, wildlife biology, forestry, sustainable agriculture, and environmental toxicology. In addition, this program would draw on economics, political

science, and public policy analysis. Research outlooks would tend to be positivist and empirical, with contributions from philosophy. The philosophical emphasis could incorporate elements of both the ecocentric and anthropocentric agendas. A variant would be to emphasize the traditional focus on natural resources or environmental science. Either variant would fit best in a natural science division, given the requirements for laboratories and support for scientific research.

Literature and philosophy. The subject matter of programs that take this approach would include ethics, aesthetics, metaphysics, phenomenology, and the connection of human cultures to the land. The curricula of these programs would normally require courses in environmental history, nature literature, religion and nature, and environmental philosophy. The most compatible additional topics would be sustainable agriculture, land-use planning, bioregional studies, environmental policy, animal rights, ecology, and natural history. This approach, like the first, is fully multidisciplinary, with rich potential for interdisciplinary research. It would be housed most comfortably in a humanities department or school.

Social criticism and critical theory. Similar in philosophical orientation to programs in science and technology studies, this approach springs from the New Left and other philosophies that challenge the assumptions of modernity; these programs would be based on critiques of the free market or capitalist economy, the hegemony of science, globalization of trade, ever-increasing economic growth and consumption, community instability, alienation, independence (e.g., caused by the automobile), positivism, scientific reductionism (versus holism), authoritarianism, and sexism. Courses would typically emphasize humanistic values, including social justice and equity in both developed and developing societies, and the mastery of critical analysis skills. Programs of this type would be influenced by feminism and other emancipatory doctrines and would welcome scholars specializing in po-

litical ecology, ecofeminism, and environmental justice. This approach would fit easily within a social science division.

Each of these approaches is sufficiently coherent to constitute an undergraduate major or university department. Each has its own canon and epistemological foundation. (Nevertheless, each is still vulnerable to multidisciplinary illiteracy in its graduates.) We believe, however, that mixing them is pedagogically questionable and institutionally disastrous, the former because the subject matter is too broad, and the latter because the combinations bring together faculty with deeply divergent worldviews. In theory, these philosophical differences could stimulate productive cross-fertilization, for example, on the nature of social inquiry. But program areas that are "naturally" less compatible place heavier burdens on faculty to manage their fundamental normative conflicts, lest they find themselves in chronic disagreement on issues of program identity, directions for growth, curricular content, and faculty recruitment.

Ideally, such ideological conflict is manageable when faculty are strongly committed to making an opportunity out of competing paradigms, but it may be difficult or impossible to nurture a sense of camaraderie or community in a very broad program (Braddock et al. 1994). As Braddock et al. (1994) note, one of the most critical and difficult disciplinary divides to bridge is that between the social and natural sciences. We have found that success in this "bridging" requires social scientists who have a background and a continuing interest in science, as well as natural scientists who are not only committed to grasping the nettle of politics and policy but also humble enough to admit ignorance of these matters, at least in the beginning of their collaboration.

Even if interpersonal conflicts could be worked out, however, "universalist" programs fail to address the curricular and pedagogical problems of coherence and depth. Thus, we recommend that environmental studies programs avoid the "universalist trap." Collegial relations aside, the more diverse a program, the less

coherent its curriculum and the greater its risk of producing intellectually shallow graduates. Achieving the dual objectives of curricular coherence and rigor requires limits on diversity.

Thus, our solution to "the environmental studies problem" would limit diversity *within*, but not *between*, programs. Implicit in our recommendations is that some existing programs should split along fractious ideological or methodological boundaries, particularly along the borders between the three approaches outlined above. Would such divisions mean that students would not be exposed to alternative points of view? Of course not. Breadth is relative, and even the narrowest of environmental programs is likely to be much broader than any disciplinary major. Moreover, additional breadth can be attained by requiring or recommending that students take courses from other departments or units.

Let us forget, the goal of most students is to graduate and get on with their lives. Although most of them entertain ideas about social justice, environmental quality, and ecological integrity, few feel the need to commit deeply to a particular, exclusive ideology about the fundamental causes of the human condition or environmental problems. Even if many academics cannot successfully bridge the ideological and epistemological divides, they can at least provide a good education by carving out coherent, compatible majors within the immense ambit of environmental subjects and concerns. Moreover, an environmental education must shield graduates from the accusation of dilettantism.

Environmental studies programs are defined by their curricula. As long as a curriculum lacks coherence, environmental studies is probably indefinable. At best, an environmental studies major equips its graduates with an exceptional breadth and depth of knowledge, benefiting them, society, and nature. Without curricular depth and coherence, however, such programs can fail by any standard of academic excellence. As long as students suffer from multidisciplinary illiteracy, a disservice is done to them and to

society. The solution to these dilemmas of quality, identity, and definition is to acknowledge the field's explosion in diversity and to deal with this heterogeneity in ways that recognize the potential dangers of curricular universalism. Environmental studies does not need to become a university in miniature.

Acknowledgments

We thank David Orr, David Allan, David Johns, Jennifer Anderson, Marc Mangel, Rich Howarth, and anonymous reviewers for their thoughtful comments and suggestions.

References cited

- Baskin Y. 1997. *The Work of Nature: How the Diversity of Life Sustains Us*. Washington (DC): Island Press.
- Bosso CJ. 1996. Seizing back the day: The challenge to environmental activism in the 1990s. Pages 53–74 in Vig NJ, Kraft ME, eds. *Environmental Policy in the 1990s*. 3rd ed. Washington (DC): Congressional Quarterly Press.
- Braddock RD, Fien J, Rickson R. 1994. Environmental studies: Managing the disciplinary divide. *The Environmentalist* 14: 35–46.
- Brough H. 1992. Environmental studies: Is it academic? *World Watch* Jan/Feb: 26–33.
- Cairns Jr. J. 1979. Academic blocks to assessing environmental impacts of water supply alternatives. Pages 77–79 in Blackburn AM, ed. *Thames/Potomac Seminars: Proceedings of the Washington Seminar*. Washington (DC): Interstate Commission on the Potomac River Basin.
- Callicott JB. 1980. Animal liberation: A triangular affair. *Environmental Ethics* 2: 311–338.
- Carson R. 1962. *Silent Spring*. Boston: Houghton-Mifflin.
- Daily GC. 1997. *Nature's Services: Societal Dependence on Natural Ecosystems*. Washington (DC): Island Press.
- Eckersley R. 1992. *Environmentalism and Political Theory: Toward an Ecocentric Approach*. Albany (NY): State University of New York Press.
- Ehrlich P, Ehrlich A. 1996. *Betrayal of Science and Reason: How Anti-Environmental Rhetoric Threatens Our Future*. Washington (DC): Island Press.
- Ehrlich PR, Ehrlich AH, Holdren JP. 1970. *Ecoscience: Population, Resources, Environment*. San Francisco: W.H. Freeman.
- Hardin G. 1968. The tragedy of the commons. *Science* 162: 1243–1248.
- Hays S. 1959. *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890–1920*. Cambridge (MA): Harvard University Press.
- Lester JP, Stewart Jr J. 1996. *Public Policy: An Evolutionary Approach*. St. Paul (MN): West Publishing Co.
- Lively CE, Preiss JJ. 1957. *Conservation Education in American Colleges*. New York:

BE LESS PRODUCTIVE AT THE OFFICE.

The office has always been a

place to get ahead. Unfortunately, it's also a place where a lot of natural resources start to fall behind. Take a look around the next time you're at work. See how many lights are left on when people leave. See how much paper is being wasted. How much

electricity is being used to run computers that are left on. Look

Use both sides of the paper when writing a memo.

at how much water is being wasted in the restrooms. And

how much solid waste is being thrown out in the trash cans. We bet it's a lot.

Now, here are some simple ways you can produce less waste at work.

When you're at the copier, only make the copies you need. Use both sides of the paper when writing a memo. Turn off your light when you leave. Use a lower watt bulb in your lamps. Drink your coffee or tea out of mugs instead of throwaway cups.

IT'S A CONNECTED WORLD. DO YOUR SHARE.

Set up a recycling bin for aluminum cans and one for bottles. And when you're in the bathroom brushing



your teeth or washing your face,

don't let the faucet

Drink out of mugs instead of throwaway cups.

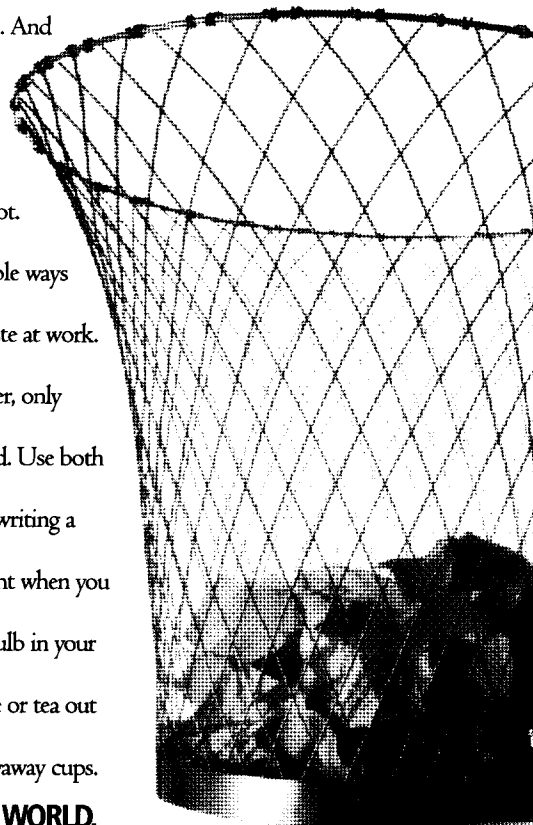
run. Remember, if we use fewer resources

today, we'll save more for tomorrow.

Which would truly be a job well done.

FOR MORE INFORMATION AND TIPS

CALL 1-800-MY-SHARE



The Ronald Press Co.
 Naess A. 1989. Ecology, Community, and Lifestyle. Translated by Rothenberg D. Cambridge (UK): Cambridge University Press.
 Nash R. 1967. Wilderness and the American Mind. New Haven (CT): Yale University Press.
 _____. 1977. Goodby renaissance road. Journal of Environmental Education 8: 2-3.
 Odum EP. 1971 Fundamentals of Ecology. 3rd ed. Philadelphia: Saunders.
 Orr DW. 1992. Ecological Literacy: Education and the Transition to a Postmodern World. Albany (NY): State University of New York Press.
 Schoenfeld C, ed. 1971. Outlines of Environmental Education. Madison (WI): Dembar Educational Services.
 Schoenfeld C, Disinger J, eds. 1978. Environmental Education in Action—II: Case Studies of Environmental Studies Programs in Colleges and Universities Today. Columbus (OH): ERIC Clearinghouse for Science, Mathematics, and Environmental Education.
 Sears PB. 1964. Ecology—A subversive science. BioScience 14 (July): 11-13.
 Shepard P, McKinley D, eds. 1969. The Subversive Science. Boston: Houghton Mifflin.
 Soulé ME, Lease G, eds. 1995. Reinventing Nature? Response to Postmodern Deconstruction. Washington (DC): Island Press.
 Williams M. 1989. Americans and Their Forests: A Historical Geography. Cambridge (MA): Cambridge University Press.
 Woodwell GM. 1970. Effects of pollution on the structure and physiology of ecosystems. Science 168: 429-433.
 Worster D. 1994. Nature's Economy: A History of Ecological Ideas. 2nd ed. New York: Cambridge University Press.

Michael E. Soulé (e-mail: soule@co.tds.net) is a research professor and Daniel Press is an associate professor in the Department of Environmental Studies, University of California, Santa Cruz, CA 95064. Soulé can be reached at P.O. Box 2010, Hotchkiss, CO 81419. © 1998 American Institute of Biological Sciences.

