

# A survey of the implementation status of environmental management systems in U.S. colleges and universities

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## Abstract

A census of 925 U.S. colleges and universities offering masters and doctorate degrees was conducted in order to study the number of elements of an environmental management system possessed by small, medium and large institutions. A 30% response rate was received with 273 responses included in the final data analysis. Overall, the number of environmental management system elements implemented among the 273 institutions ranged from 0 to 16, with a median of 12. The proportion of U.S. colleges and universities that reported having implemented a structured, comprehensive environmental management system is discussed. Stratified analyses were performed by institution size, Carnegie Classification and job title.

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## 1. Introduction

In an effort to protect public health, the number of environmental regulations has increased substantially during the last thirty years in the United States (U.S.) [1–4]. In recent years, U.S. colleges and universities have come under increased scrutiny by state and federal regulators regarding environmental matters [5–7]. This has elicited various responses, including attempts at modification of federal regulations for colleges and universities, environmental incentive programs, and the implementation of International Organization for Standardization (ISO) 14001 registered environmental management systems [8–13]. ISO 14001 is a voluntary international standard that sets requirements for the establishment of an environmental management system, which provides a framework for companies and government agencies to develop and maintain a reliable process that consistently meets environmental obligations and commitments [14]. Environmental management

systems, when registered and audited regularly by an accredited third party, may become ISO 14001 certified [15]. This certification or registration is largely unknown in U.S. college and university circles with just a few universities, including The University of Missouri Rolla and The University of Texas M.D. Anderson Cancer Center, having achieved it to date [16,17]. However, ISO 14001 is becoming increasingly popular in U.S. industry, due to the major automobile manufacturers' insistence that their suppliers become registered by 2003 in order to avoid environmental scandals and fines [18].

## 2. Essential elements of environmental management systems

Essential elements of an environmental management system were identified by studying the ISO 14001 Standard [15] and include: 1) a written environmental policy, 2) the identification of activities that may affect the environment, 3) the development of environmental programs with objectives and targets, 4) use of a procedure to identify legal

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requirements applicable to environmental issues, 5) assigning responsibilities for environmental matters to specific individuals, 6) reporting environmental performance issues to top management on a routine basis, 7) training for individuals whose actions may have an impact on the environment, 8) maintaining documentation regarding internal and external communications about environmental matters, 9) creating a system to ensure that personnel are working with the most current versions of environmental procedures, 10) having environmental emergency preparedness and response procedures in place, 11) monitoring and measuring operations that could have an environmental impact, 12) having procedures in place to correct any environmental non-conformances, 13) having procedures in place to manage and store environmental records, 14) conducting routine internal audits of the environmental program, 15) conducting routine third party audits of the environmental program, and 16) holding a periodic review of the environmental program by upper institutional management. In implementing these sixteen essential elements, the ISO 14001 [15] requirements of environmental management system documentation and operational control would be established and therefore are not listed separately as essential environmental management system elements for this study.

### 3. USEPA Region III Colleges and Universities Initiative Survey

Upon completion of a review of the literature encompassing 1966 to the present using MEDLINE and Current Contents, only two surveys were found that were recent and related to this research. The United States Environmental Protection Agency (USEPA) Region III, Office of Enforcement, Compliance and Environmental Justice conducted a survey to follow up on their Colleges and Universities Initiative, an educational outreach program started in May 1999 [19]. USEPA Region III encompasses Washington D.C., Delaware, Maryland, Pennsylvania, Virginia and West Virginia. The initiative included providing educational workshops and a website with specific information regarding environmental compliance and federal regulations and links to other pertinent information/sites. This survey was directed at ascertaining how much knowledge regarding environmental regulations the participants had gained, and what types of behavioral changes had resulted. Sixty-nine higher education institutions in USEPA Region III were surveyed.

The Colleges and Universities Initiative appeared to have been successful, as 95% of those surveyed “were aware of the initiative and (had) had some contact with materials regarding the initiative” [19]. Over 50% of survey participants reported that changes were being made to increase environmental compliance. In addition, substantial pollutant reductions were reported, for example, 39.1% indicated that hazardous waste generation had decreased; 34.8% had reduced toxic material use; 31.9% had reduced energy usage. Survey participant feedback was quite positive. According to this survey, 36.2% of the 69 two and four year higher education

institutions surveyed in USEPA Region III in this 2000 study had established an environmental management system [19].

### 4. National Wildlife Federation’s State of the Campus Environment Survey

The second survey was conducted by the National Wildlife Federation’s Campus Ecology program along with Princeton Survey Research Associates and described as the “most comprehensive survey ever undertaken of the environmental management practices at U.S. institutions of higher learning” [20]. Their survey population, obtained from the 2000 *Higher Education Directory* [21], was the leadership at two and four year institutions of higher learning: presidents, provosts and facilities chiefs. Three different surveys were administered to these three audiences. Results were received from 891/3907 (a 22.8% response rate) [20] U.S. colleges and universities and published in “State of the Campus Environment: A National Report Card on Environmental Performance and Sustainability in Higher Education” [22]. Many of the questions on this survey were geared towards ecological aspects such as energy conservation, integration of environmental issues into curricula, recycling, landscaping, and transportation. Some of the general findings included that the most common energy, landscaping, and transportation strategies reported were lighting retrofits, integrated pest management and placement of bicycle racks, respectively. In addition, it was reported that a majority of four-year college and university students take an environmental class. “Reducing solid waste, environmentally preferable purchasing, energy and water conservation and efficiency, and design of new buildings” [22] were reported as future areas of interest by these educational institutions.

### 5. Survey rationale

Implementation of environmental management systems at colleges and universities that generate the complex mixtures of hazardous waste resulting from research would result in increased compliance with local, state and federal regulations. Many U.S. colleges and universities have implemented some but not all essential elements of an environmental management system. The essential elements of an environmental management system are defined as those described above, and have been taken from the ISO 14001 Standard [15].

The USEPA in Region III surveyed the success of their Colleges and Universities Initiative [19], however, the overlap between questions asked in that survey and in this study was only a single question, and their study population was limited to Region III. While the National Wildlife Federation’s survey [22] was national, it was focused on ecology not on environmental management systems. There is an overlap of three questions with this study. The study populations are very different among these three surveys, as are the scope of the questions. Overlapping questions and their results are compared later in this paper. While some of the components of an environmental management system are the focus of

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