Environmental & Water Resources Systems Education Committee

Task Committee of the Environmental & Water Resources Systems Committee and the Operations Management Committee,

EWRI Planning and Management Council

Purpose: To promote water and environmental systems engineering education through the fostering of problem formulation, analysis, interpretation, and communication skills.

Objectives:

The Committee will develop a set of environmental and water resources systems engineering case studies for classroom use. Case study use provides for active and discovery-based learning experiences, potentially engages industry and government in the university educational experience, and may encourage more undergraduate students to pursue graduate degrees. While the initial focus will be to develop case studies for use at the university level (undergraduate and graduate), this may be broadened to include case studies for high school students. Adapting the cases for use in high schools would further the outreach mission of the university and promote interest in the profession.

For each case study, students will be given substantial background information pertinent to current water and environmental management issues, including geographic, hydrogeological, and other natural resource information; and social, economic, and political information, including the history of development in the region. A series of exercises will also be provided related to each case study. These exercises will consist of additional research, team participation, and computer exercises. Through the computer exercises, students will be introduced to technologies commonly used in the profession, including simulation and optimization models, visualization tools, and geographic information systems.

All case studies will be made freely available on the web, and the web site will be publicized through presentations at professional meetings and electronic media. Additionally, one or more journal papers will be submitted to journals such as the ASCE Journal of Professional Issues in Engineering Education and Practice to relate the development, use, and impact of the case studies.

Useful background information on the development and use of engineering case studies is available from The Center for Case Studies in Engineering at Rose-Hulman Institute of Technology (http://www.civeng.carleton.ca/ECL/). Although there are a large number of case studies available at this site, most are over 20 years old, and there are only a couple that are related to environmental or water resources problems.

Some suggested topics for technology-based environmental and water resources systems case studies are as follows:

1. Cost-benefit analysis for a large-scale water resources project (Upper Mississippi/Illinois Waterway)
2. Hydroelectric power generation in a period of deregulation (CA, TX?)
3. Comprehensive flood damage reduction and environmental restoration studies (USACE)
4. Great Lakes forecasting and management
5. Hydrologic frequency analysis (American River, CA)
6. Water quantity and quality management for environmental restoration (South Florida)
7. Use of radar-rainfall measurements for hydrologic prediction
8. Use of meteorological forecasts in water resource management
9. Remote sensing applications in environmental and water resources modeling
10. Groundwater site investigation/remediation design
11. Shared vision modeling (ACT-ACF)
12. Water supply planning and the Endangered Species Act (Pacific Northwest)

Committee Members:

David W. Watkins (chair)
Dept. of Civil & Environmental Engrg.
Michigan Technological University
Houghton, MI 49931-1295
Tel: 906-487-1640
Fax: 906-487-2943
E-mail: dwatkins@mtu.edu

Richard Vogel (secretary)
Dept. of Civil & Environmental Engrg
Tufts University
Medford, MA 02155
E-mail: rvogel@tufts.edu

Amy Chan Hilton (vice chair)
Dept. of Civil and Environmental Engineering
Florida A&M University - Florida State University
2525 Potsdamter St
Tallahassee, FL 32310
Phone: (850) 410-6121
Fax: (850) 410-6142
E-mail: abchan@eng.fsu.edu

Avi Ostfeld
Dept. of Civil Engineering
Technion, Haifa 32000
Israel
E-mail: ostfeld@tx.technion.ac.il

Chuck Howard
1350 Rockland Ave.
Victoria, B.C.
Canada

Teresa Culver
Department of Civil Engineering
P.O. Box 400742
The University of Virginia
Charlottesville, VA 22904-4742
Tel: (804)-924-6375
FAX: (804)-982-2951
E-mail: tculver@virginia.edu

G.V. Loganathan

George McMahon

Miguel Marino

Ranji Ranjithan

Dominic Bochelli

How does this committee fulfill the mission and focus of the EWRI Division?

The goals of this Task Committee are closely aligned with ASCE’s plan to provide improved and comprehensive products and services to engineers and related professionals working in educational areas. The educational resources produced will promote a diverse and empowered membership in EWRI, collaborative partnerships, and innovative solutions environmental and water resource problems.

Does this committee functionally overlap with other EWRI committees?

The functions of this task committee do not directly overlap those of any other EWRI committee, but this committee would benefit from close interaction with the Research and Education Council.
(Rafael G. Quimpo, Council Chair) and the Task Committee on the Education of Future Environmental and Water Resources Engineers (Margaret Petersen, Chair). This task committee also expects to interact with other EWRI technical committees such as the Operations Management and Groundwater Management committees.

**Milestone dates for completion of planned committee activities.**

The committee should begin officially shortly after the 2003 EWRI conference in Philadelphia. Upon completion of its objectives, the committee will be retired in the year 2005 after the publication of the journal articles. Specific milestones are as follows:

- **July 2003** – Task committee members assembled and case studies selected.

- **December 2004** – Preliminary development of university-level case studies completed and posted on the web for committee review. Plans for high school case studies developed.

- **June 2004** – Task committee meeting at EWRI conference. Student and instructor evaluations of university case studies reviewed and revisions suggested. Outline for journal paper(s) developed.

- **December 2004** – High school case studies developed and reviewed. Draft of journal paper(s) completed for review by committee. Student and instructor evaluations of high school case studies reviewed and revisions suggested.

- **June 2005** – Final task committee meeting at EWRI conference. Final case study products and journal paper(s) reviewed.

**Funding requirement for planned committee activities.**

The funding requested is to support meeting once a year for each year of operation. This will include meetings at the EWRI conference in years 2004 and 2005. We will establish three control group members and request approximately $400 per member for each meeting (3x2x$400 = $2,400). We are also requesting $3000 for publication expenses, including printing, binding and website development.