

FUNDING

These learning materials have been developed under the auspices of funding provided by STAR Research Assistance Agreements from the Environmental Protection Agency (EPA) to a pair of cooperating Programs, and represent substantial contributions from both of these Programs. These Programs were the Space-Time Aquatic Resources Modeling and Analysis Program (STARMAP) in the Department of Statistics at Colorado State University, Fort Collins, Co (funded under CR-829095) and Designs and Models for Aquatic Resource Surveys (DAMARS) in the Department of Statistics at Oregon State University, Corvallis, OR (funded under CR-829096). This material has not been formally reviewed by the EPA. The materials and views expressed here are solely those of the contributors listed below, STARMAP, and DAMARS. EPA does not endorse any products or commercial services mentioned in these learning materials.

CONTEXTUAL NOTE: These materials were developed in response to EPA's Request for Assistance (RFA) entitled **Research Program on Statistical Survey Design and Analysis for Aquatic Resources**. This RFA contained GUIDELINES FOR CONDUCTING STATISTICAL SURVEY DESIGN AND ANALYSIS RESEARCH, which included

6. Proposals should specifically address the extension of expertise on design and analysis to States and Tribes. Such a component should consider the level of statistical training that may be extant in State and Tribal environmental management and resource agencies. Research on and demonstration of distance learning concepts that allow individuals with basic statistics training to study and understand the concepts of design and analysis statistics are encouraged. Training as used here does not include work leading to a baccalaureate or advanced degree, but might include seminars, workshops, demonstrations, handbooks, and the like. This component must include an actual case study applying the distance learning concept and be readily transferable to others.

The two Programs proposed two approaches for meeting this requirement: These materials and direct interaction with various members of the client communities. The latter are reported elsewhere.

CONTRIBUTORS

N. Scott Urquhart, the Director of STARMAP, coordinated the development of these materials and wrote several parts, including some case study material.

Gerald Scarzella developed and tested the initial learning materials. Scarzella conducted a test of his initial materials and approach in conjunction with the Second Annual Conference on Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003. He and this project gratefully acknowledge help from *Darrin Goodman* of the Instructional Services Department of Colorado State University in the development of the web-based tutorial for this project by creating the graphical headings and other web page graphical links. *Greg Fencl* developed the framework of the tutorial and assisted in the transformation of the original document to a web-page format.

Seven individuals from the Pacific Northwest participated in a workshop designed to familiarize themselves to the initial learning materials and gave written evaluations of its educational viability. Scarzella and this project thank these evaluators:

Lillian Herger, Fish Biologist, U.S. EPA, Region 10;
Glenn Merritt, Freshwater Monitoring Unit, Washington State Department of Ecology;
Sarah Lowe, Environmental Scientist, San Francisco Estuary Institute, Oakland, CA;
Jeff Rodgers, Oregon Plan Monitoring Coordinator, Oregon Department of Fish and Wildlife;
Rick Hafele, Special Projects, Oregon Department of Environmental Quality;
Doug Drake, Aquatic Biologist, Watershed Assessment Section, Oregon Department of Environmental Quality

Scarzella summarized his work in as part of this Technical Report:

Scarzella, G. (2003). **Learning Materials for Surface Water Monitoring**. Masters Project Report, Department of Statistics, Colorado State University, Fort Collins. Available at {Link}.

Jay Araas attended the EMAP training at EPA's Western Ecology Division in June, 2004, to video-tape the classroom and field parts of the training sessions. EPA cooperators also provided him with their PowerPoint presentation materials. The video quality of the classroom presentations was far inferior to the video of the field presentations. Consequently Araas transcribed the audio onto adjoining PowerPoint slides, and adapted those to a pdf presentation format. This effort produced about 600 pages of the learning materials, almost all of it related to "How to Monitor." Araas and this project gratefully acknowledge the assistance of Jon L. Stoddard, Dave V. Peck, and Phil Kaufmann, all of the U.S. Environmental Protection Agency, as well as Bob M. Hughes of Dynamac, Inc., A.T. Herlihy of Oregon State University, and Michael T. Barbour and Kristen L. Pavlik of Tetra Tech, Inc. Each contributed the individual PowerPoint files used in the compilation of this project. Jon Stoddard, Dave Peck, Phil Kaufmann, and Bob Hughes also supplied the comments that were used in the audio narration of the interactive presentation. This effort resulted in the following Technical Report:

Araas, J.F. (2005). **EMAP West Training Presentations**. Masters Project Report, Department of Statistics, Colorado State University

Desiree Bailey drafted some of the material related to data cleanup.

Daniel Hernandez-Stumpfhauser imported most of the previously developed learning materials into Adobe FrameMaker and created consistently organized pdf files, especially for the section focused on How to Monitor.

Leigh Ann Harrod collaborated with Virginia Lesser in developing the materials associated with non-responses. This project was carried out under the supervision of DAMARS at Oregon State University, and was reported in

Harrod, L.A. and V.M. Lesser. **Ignorable Nonresponse Adjustment Procedures and Algorithms**. Technical Report, Department of Statistics, Oregon State University. March 2, 2006. 44 pages.