



THIRD ANNUAL CONFERENCE:
**STATISTICAL SURVEY DESIGN AND ANALYSIS
FOR AQUATIC RESOURCES**

Department of Statistics, Colorado State University
September 10 - 11, 2004

SPONSORED BY: STARMAP in collaboration with DAMARS

STARMAP = Space-time Aquatic Resources Modeling and Analysis Program

DAMARS = Design and Model for Aquatic Resource Surveys

Both funded by EPA STAR Cooperative Agreements (CR-829095 & 829096)

FINAL AGENDA

updated through 9/8/04

Friday 9/10/2004

PLACE: Room 228, Lory Student Center, Colorado State University Campus.

8:00 – 8:30: Registration and Breakfast Snacks

8:30 – 8:45: Introduction/Welcome/Background

- ◆ *Introduction.* Richard Davis, Chair, Department of Statistics, Colorado State University
- ◆ *Welcome.* Rick Miranda, Dean, College of Natural Sciences, Colorado State University
- ◆ *Introduction of Attendees.* Scott Urquhart, STARMAP director, Colorado State University

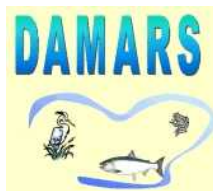
8:45 – 9:30: Keynote Speaker

Methods for Integrating Monitoring and Assessment for the Clean Water Act [305(b)/303(d)] Reporting. Dan McKenzie, WED, NHEERL, USEPA, Corvallis, OR

9:30– 10:15: Overview of the DAMARS Program. Don L. Stevens, Jr., DAMARS Director, Department of Statistics, Oregon State University

10:15 – 10:45: Break

10:45 – 11:30: Overview of the STARMAP Program. N. Scott Urquhart, STARMAP Director, Department of Statistics, Colorado State University.



11:30 – 12:30: **Lunch** - in the conference room. Time to view posters (See the list of posters at the end of this agenda.)

12:30 – 2:30: **Session I. MODELING - METHODS.** Chair: Jennifer A. Hoeting, Colorado State University

- ◆ *Nonparametric Survey Regression Estimation Using Penalized Splines.* F. Jay Breidt, Department of Statistics, Colorado State University, Jean Opsomer, Department of Statistics, Iowa State University, Giovanna Ranalli and Mark Delorey, Department of Statistics, Colorado State University
- ◆ *State-Space Models for Biological Monitoring Data.* Devin S. Johnson, Department of Mathematical Sciences, University of Alaska, Fairbank, and Jennifer A. Hoeting, Department of Statistics, Colorado State University
- ◆ *Model Selection for Geostatistical Models.* Andrew A. Merton, Jennifer A. Hoeting, and Richard A. Davis, Department of Statistics, Colorado State University

2:30 - 3:00: **Break**

3:00 – 5:00: **Session II: MODELING - APPLICATIONS.** Chair: Kathi Georgitis, Oregon State University

- ◆ *Comparison of Variance Estimators for Two-dimensional, Spatially-Structured Sample Designs.* Susan Hornsby and Don L. Stevens, Jr., Department of Statistics, Oregon State University
- ◆ *Hierarchical Bayesian Models for Seasonal Radio Telemetry Habitat Data.* Megan C. Dailey, Department of Statistics, Colorado State University, and Alix I. Gitelman and Fred L. Ramsey, Oregon State University
- ◆ *Chain Graphs for Spatial Dependence in Ecological Data.* Alix A. Gitelman. Department of Statistics, Oregon State University
- ◆ *A Brief Introduction to Reversible Jump MCMC for Bayesian Networks and an Application.* Stephen Jensen, CleverSet Inc, Corvallis, OR
- ◆ *Comparison of Design-Based and Model-Based Techniques for Selecting Spatially Balanced Samples of Environmental Resources.* Don L. Stevens, Jr., Department of Statistics, Oregon State University

5:30 - 7:30 - hosted reception; Water Plaza - One Block East of Student Center

Saturday, September 11, 2004

PLACE: 167 Rockwell Hall, Colorado State University Campus (across parking lot north from Student Center)

Note: This is a different location from the location of the Friday sessions

7:45 - 8:15: **Breakfast Snacks**

8:15 – 9:45: Session III: **MODELING - INDICATORS** Chair: David Theobald, Natural Resources Laboratory, Colorado State University

- ◆ *Predicting the Likelihood of Water Quality Impaired Stream Reaches Using Landscape Scale Data and a Hierarchical Methodology.* Erin Poston, Department of Geosciences, Colorado State University
- ◆ *A Framework for Landscape Indicators for Measuring Aquatic Responses.* David Theobald, Natural Resources Ecology Laboratory and Department of Natural Resources Recreation & Tourism, Colorado State University
- ◆ *What is a Multi-Scale Analysis? Implications for Modeling Presence/Absence of Bird Species.* Kathi Georgitis, Alix Gitelman, Department of Statistics, Oregon State University, and Nick P. Danz, Natural Resources Research Center, University of Minnesota Duluth

9:45 - 10:15 **Break**

10:15 – 12:00: **Session IV: SAMPLING - METHODS.** Chair: Virginia M. Lesser, Oregon State University

- ◆ *Use of Estimating Equations and Quadratic Inference Functions in Complex Surveys.* Leigh Ann Harrod and Virginia M. Lesser, Department of Statistics, Oregon State University
- ◆ *Adjustment Procedures to Account for Non-Ignorable Missing Data in Environmental Surveys.* Breda Munoz and Virginia Lesser, Department of Statistics, Oregon State University
- ◆ *A Weighting Class Adjustment Estimator for the Total Under a Stratified Sampling Design in a Continuous Domain.* Breda Munoz and Virginia Lesser, Department of Statistics, Oregon State University
- ◆ *Characterizing Design-Based Properties of a Spatial Sample to Quantify Design-Based Variance of Model-based Estimators.* Cynthia Cooper, Department of Statistics, Oregon State University

12:00 - 1:00 Lunch - in the Plaza of Rockwell Building

1:00 – 2:30: **Session V: SAMPLING - APPLICATIONS** Chair: Leigh Ann Harrod, Oregon State University

- ◆ *Sampling Strategies for Chinook-salmon Spawning Populations.* Jean-Yves (Pip) Courbois, NOAA-Fisheries, Northwest Fisheries Sciences Center, Seattle, WA
- ◆ *Spatio-Temporal Modeling of the Abundance of Spawning Coho in Oregon Coastal Streams.* Ruben A. Smith and Don L. Stevens, Jr., Department of Statistics, Oregon State University
- ◆ *Multi-Lag Cluster Enhancement of Fixed Grids for Variogram Estimation in Near Coastal Systems.* Kerry J. Ritter, and Molly K. Leecaster, Southern California Coastal Water Research Project (to be presented by Scott Urquhart, due to an injury of the

scheduled speaker)

2:30 - 2:45: Concluding Discussion & Wrap-Up

3:15: Science Advisory Committee

Attendance at SAC Meeting is by invitation, only. State Room, Holiday Inn, University Park (main floor, south side of east corridor)

POSTERS

- ◆ *Sampling Perennial Streams: An Application in Model Based Optimal Design.* William J. Coar and F. Jay Breidt, Department of Statistics, Colorado State University
- ◆ *One-dimensional Point Processes in Ecology.* Jean-Yves Courbois, NOAA-Fisheries, Northwest Fisheries Sciences Center, Seattle, WA
- ◆ *Hierarchical Bayesian Models for Seasonal Radio Telemetry Habitat Data.* Megan C. Dailey, Department of Statistics, Colorado State University, and Alix I. Gitelman, Department of Statistics, Oregon State University. Displayed at the Graybill Conference, Colorado State University, June 16 - 18, 2004 and The International Environmetrics Conference, Portland, ME, June 28 - July 1, 2004
- ◆ *Distribution Function Estimation in Small Areas for Aquatic Resources.* Mark J. Delorey, Department of Statistics, Colorado State University. Displayed at the Graybill Conference, Colorado State University, June 16 - 18, 2004
- ◆ *Nonparametric, Model-Assisted Estimation for a Two-Stage Sampling Design.* Mark Delorey and F. Jay Breidt, Department of Statistics, Colorado State University
- ◆ *What is a multi-scale analysis? Implications for modeling presence/absence of bird species.* Kathi Georgitis, Alix Gitelman, Don L. Stevens Jr., Department of Statistics, Oregon State University, Nick P. Danz, and JoAnn M. Hanowski, Natural Resources Research Center, Univ of Minnesota Duluth. Displayed at The International Environmetrics Conference, Portland, ME, June 28 - July 1, 2004
- ◆ *Predicting the Likelihood of Water Quality Impaired Stream Reaches Using Landscape Scale Data and a Hierarchical Methodology: a Case Study in the Southern Rocky Mountains.* Erin E. Poston, Department of Geosciences, David M. Theobald, Natural Resources Ecology Laboratory and Department of Natural Resources Recreation & Tourism, Melinda J. Laituri, and N. Scott Urquhart, Department of Statistics, all at Colorado State University. Related poster displayed at the American Water Resources Association GIS Specialty Conference, Nashville, TN, May 17-19, 2004, and the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003
- ◆ *Two-stage Sampling Designs for Birds in Great Lakes Wetlands.* Ron Regal, Dept of Mathematics and Statistics, University of Minnesota Duluth, Don L. Stevens, Jr., Dept of Statistics, Oregon State University, Nick P. Danz and JoAnn M. Hanowski, Natural Resources Research Center, Univ of Minnesota Duluth, and Robert W.

Howe, Department of Natural and Applied Sciences, University of Wisconsin-Green Bay

- ◆ *Learning Materials for Surface Water Monitoring.* N. Scott Urquhart, Department of Statistics, Colorado State University. Displayed at the EMAP Symposium 2004, Newport, RI, May 4 - 7, 2004

YEAR 2

- ◆ *Applications of Nonparametric Survey Regression Estimation in Aquatic Resources.* F. Jay Breidt, F.J., Siobahn Everson-Stewart, and Alicia A. Johnson, Colorado State University, and Jean D. Opsomer, Iowa State University. Displayed at the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003
- ◆ *A Cost Analysis for Incorporating Human Judgment into Ecological Sampling.* Rebecca A Buchanan and Loveday L. Conquest, University of Washington and Jean-Yves Courbois, NOAA-Fisheries, Northwest Fisheries Sciences Center, Seattle, WA, February 6, 2003 (This poster was discussed at the Research Symposium of the UW's Center for Water and Watershed Studies, and was judged the runner-up for the Best Poster.)
- ◆ *Bayesian Belief Networks: Computational Considerations for the Environmental Researcher.* Steve Jensen, Department of Statistics, Oregon State University. Displayed at the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003
- ◆ *Analysis and Modeling of Acid Neutralizing Capacity in the Mid-Atlantic Highlands Area.* Brett Kellum, Jennifer A. Hoeting, and N. Scott Urquhart, Department of Statistics, Colorado State University. Displayed at the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003
- ◆ *Assessment of a Semi-automated Catchment Delineation and Flow Accumulation Method.* Mary Kneeland and David T. Theobald, Natural Resources Ecology Lab, Colorado State University. Displayed at the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003
- ◆ *Empirical Orthogonal Functions.* Breda Munoz and Virginia Lesser, Department of Statistics, Oregon State University Displayed at the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003
- ◆ *Predicting the Likelihood of Water Quality Impaired Stream Reaches Using Landscape Scale Data and a Hierarchical Methodology: a Case Study in the Southern Rocky Mountains.* Erin E. Poston, Department of Geosciences, David T. Theobald, Natural Resources Laboratory, Melinda J. Laituri, Department of Geosciences, and N. Scott Urquhart, Department of Statistics, Colorado State University. Displayed at the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003
- ◆ *Using Species Area Curves to Understand Taxonomic and Regional Differences.* Jeannie Sifneos, Department of Statistics, Oregon State University, and Denis White,

EMAP/WED/NHEERL/ORD/EPA, Corvallis, OR. Displayed at the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003

- ◆ *Linking Watersheds and Streams Through Functional Landscape Metrics.* David T. Theobald, Natural Resources Laboratory, Colorado State University. Displayed at the Second Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Corvallis, OR, August 11 - 13, 2003

YEAR 1

- ◆ *Linking Watersheds to Streams: Using a Direct Measure of Flow to Model Hydrological Networks.* Mary Kneeland and David Theobald, Natural Resource Ecology Lab, Colorado State University. Displayed at the First Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Colorado State University, September 20- 21, 2002
- ◆ *Statistical Survey Design and Analysis for Aquatic Resources: External Collaborators of the CSU and OSU Programs.* Mary Kneeland, Natural Resources Ecology Lab, and N. Scott Urquhart, Department of Statistics, Colorado State University. Displayed at the First Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Colorado State University, September 20- 21, 2002
- ◆ *Design and Implementation of Riparian Vegetation Monitoring Along the Colorado River in Grand Canyon.* M.J.C. Kearsley, University of Northern Arizona, and N.S. Urquhart, Colorado State University. Displayed at the First Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Colorado State University, September 20- 21, 2002, and at Ecological Society of America Annual Meeting, Tucson, AZ, August 5, 2002
- ◆ *USEPA River Reach File RF3 and USGS Northwest Stream Database.* Barbara J. Rosenbaum, Computer Sciences Corp, EMAP/WED/NHEERL/ORD/EPA. Corvallis, OR. Displayed at the First Annual Conference: Statistical Survey Design and Analysis for Aquatic Resources, Colorado State University, September 20- 21, 2002