List of Exhibitors

ABT, Inc.
AbTech Industries Inc
AEI-CASC Engineering
Attitude Technology, Inc.
BaySaver Technologies, Inc.
Bio Clean Environmental Services
CDM
CDS Technologies
Clearwater Solutions
Crystal Stream Technologies
Earthwater Stencils
GeoSyntec Consultants
Global Environmental Network
Kristar Enterprises
Layfield Geosynthetics and Industrial Fabrics
MACTEC Engineering & Consulting
MRC Technologies
MWH
RBF Consulting
Reed & Graham, Inc.
Revel Environmental Manufacturing
Roscoe Moss Company
RPA
Safe Drain Inc.
Shilts Consultants
SI Geosolutions
Stormceptor
StormTrap
Stormwater Management, Inc.
URS Corporation

CASQA

CALIFORNIA STORMWATER
QUALITY ASSOCIATION™

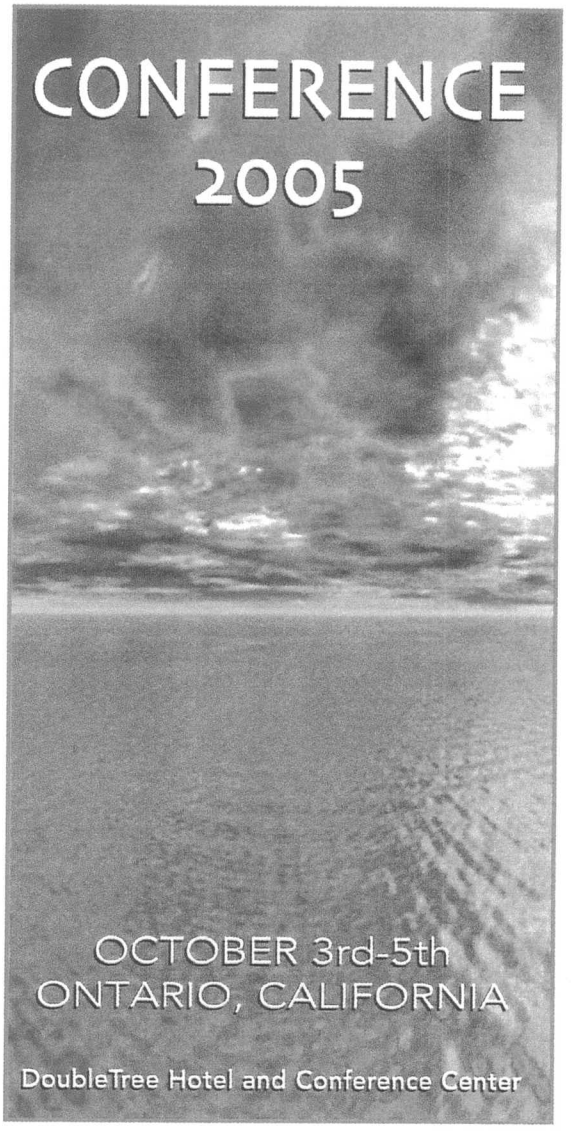
P.O. Box 2105
Menlo Park, CA 94026-2105

Phone: (650) 366-1042
Fax: (650) 365-8678
E-mail: info@casqa.org
www.casqa.org

CASQA

CALIFORNIA STORMWATER
QUALITY ASSOCIATION™

CONFERENCE 2005



OCTOBER 3rd-5th
ONTARIO, CALIFORNIA

DoubleTree Hotel and Conference Center

Greetings and thank you for participating in CASQA's inaugural conference and exposition, featuring presentations and trainings covering the full gamut of the conference theme – Stormwater, Treatment, Operations, Research, and Management.

The California Stormwater Quality Association is unique among associations in two important ways:

> CASQA is the only statewide association in the country dedicated to the advancement of stormwater quality management, science, and regulation.
>
> CASQA is an association of multiple interest groups – including government, science, industry, development, and construction – all with the common goal of advancing the stormwater quality profession.

As a result of these unique qualities, CASQA has been the "place" for stormwater quality information in California since it was founded in 1989 as the Stormwater Quality Task Force. Back then, the State looked to us for help in designing and implementing the new stormwater regulations recently mandated by Congress in the 1987 Clean Water Act amendments. Through the administrative procedures of the State Water Resources Control Board, the Stormwater Quality Task Force was formally commissioned as the principal advisor to the State on stormwater quality program issues.

Starting in the 1990s and continuing into the 2000s, local governments, businesses, and other organizations learned about stormwater quality management – designing, funding, implementing, and evaluating their stormwater quality programs along the way. And the "Task Force" meetings on the second Friday of a month were the place to be for stormwater professionals in California. During the ensuing years, the Task Force evolved into a more formal organization – the California Stormwater Quality Association. And it worked hard to increase the network of professionals it created and to receive and make more information available to more people, more easily. The location of the general meetings was switched from Sacramento to rotating between northern and southern California, and their frequency was reduced first to every-other-month and then to the current once-a-quarter frequency so subcommittees and ad hoc work groups could spend more time on the details of managing stormwater quality. That evolution brings us to this time and this place for CASQA's first comprehensive stormwater quality conference. We hope you enjoy the diverse agenda and that the information exchange is valuable to you and your work.

Again, thanks for being part of CASQA's inaugural conference!

Executive Director

Quick Reference Session Guide

Tuesday October 4, 2005

Conference Opening	8:30 AM - 9:30 AM
ROOM	EVENT
Vineyard Room	Conference Opening
SESSION 1	**9:30 AM – 10:30 AM**
Strawberry Peak Room	Stormwater Chemical Dosing System Development The Caltrans Route 73 BMP Pilot Study
Lake Silverwood Room	Riverside County's IC/ID Programs Mobile Pressure Washers, Complying with Stormwater BMPs
Big Bear Room	Life After Diazinon – What's New for Urban Creeks The Increasing Environmental Significance of Pyrethroid Pesticides & Pyrethroid Pesticide Analyses at Environmentally Relevant Levels
Lake Gregory Room	Development of a Hydromodification Management Plan for the Santa Clara Valley – Part 1: Assessment of Hydromodification Development of Hydromodification Management Plan for the Santa Clara Valley - Part 2: Performance Criteria and Guidance for Local Implementation
SESSION 2	**11:00 AM – 12:00 PM**
Strawberry Peak Room	Post-Project Monitoring of BMPs/SUDs to Determine Performance and Whole-Life Costs
Lake Silverwood Room	Treatment Trains: Don't Get Run Over Performance, Maintenance and Costs of Full Sedimentation vs. Partial Sedimentation Sand Filters
Big Bear Room	Characterization of Runoff from the Sacramento Urban Area A Watershed Scale Approach to Estimating Pollutant Loading from Dry Season Urban Runoff
Lake Gregory Room	Hydrograph Modification Management Using Simplified Low Impact Development Design
LUNCH	**12:00 PM – 1:30 PM**
Vineyard Room	CASQA Awards and Recognition Program
SESSION 3	**1:30 PM – 2:30 PM**
Strawberry Peak Room	A New Method for Estimating Runoff Quantities for Flow and Volume-based BMP Design
Lake Silverwood Room	Collaboration & Integration Opportunities for Stormwater Programs Stormwater Monitoring Coalition: A Regional Approach to Research/Monitoring in Southern California
Big Bear Room	Management of Pathogens Associated with Stormwater Discharges: Methodology and Application for Molecular Detection of Target Organisms Combined with Microbial Source Tracking First Flush Phenomenon
Lake Gregory Room	The Role of Economic Considerations in Stormwater Permits Stormwater – A Federal Legal Update
SESSION 4	**2:45 PM – 3:45 PM**
Lake Gregory Room	Simplified Low Impact Development Design for Compliance with Stormwater Treatment Requirements A Lower-Impact Development Approach for a Coastal Resort in Southern California
Lake Silverwood Room	Arroyo Seco Watershed Plan: Strategic Water Quality Implementation The Nitrogen and Selenium Management Program for the San Diego Creek and Newport Bay Watershed: An Alternative Compliance Approach to Waste Discharge Requirements
Big Bear Room	The World According to TAPE: A Journey Through the Washington State Department of Ecology's Approval Process
Strawberry Peak Room	Strategies for New Revenue in Stormwater Management: California Case Studies
SESSION 5	**4:00 PM – 5:00 PM**
Lake Gregory Room	Effects of Infiltrating Stormwater On Soils and Groundwater Countrywide Stormwater Infiltration Site Characterization Criteria and Guidance Study, Contra Costa Clean Water Program

ROOM	EVENT
Lake Silverwood Room	Evaluation of Recreational Uses and Bacteria Water Quality Objectives in the Santa Ana River Watershed
Big Bear Room	An Innovative Approach for Protecting the San Diego Marine Life Refuge: A Prototype Model for ASBS Management
Strawberry Peak Room	Rancho Mission Viejo Water Quality Management Plan

Wednesday October 5, 2005

SESSION 6	8:30 AM - 9:30 AM
Lake Gregory Room	LEED Requirements: From a Hydrology and Drainage Design Perspective Sun Valley Park Stormwater Infiltration Basin Demonstration Project
Strawberry Peak Room	The Stormwater Data Report: How Caltrans Documents Compliance in the Design Phase Using Web Technology to Improve MS4 Regulatory Reporting
Big Bear Room	Solid Measurements in Stormwater Runoff Design of BMPs for Contaminants Removal with Respect to Small Particle Size Distribution
Lake Silverwood Room	Evaluation of Municipal Stormwater Programs Implemented Throughout California Evaluation of New Development Standards for Municipal Stormwater Programs in Southern California
SESSION 7	**9:45 AM - 10:45 AM**
Lake Gregory Room	Performance of a California Wet Pond Stormwater Treatment: Can We Make Them Smaller?
Lake Silverwood Room	Analyses of the Expanded International BMP Data Base and Implications for BMP Selection and Design
Big Bear Room	Basin Sizer: A Free Software Tool for Determining Water Quality Volumes and Water Quality Flows Finding Water Body Information Using the Water Quality Planning Tool Web Site
Strawberry Peak Room	LID Techniques and Water Quality Management Plans for Water Quality Control in New Development and Redevelopment
SESSION 8	**11:00 AM - 12:00 PM**
Lake Gregory Room	Tahoe Basin BMP Evaluation and Feasibility Study Effort to Keep Lake Tahoe Blue
Strawberry Peak Room	Using a Water Quality Database as a Stormwater Program Management Tool Report of Water Quality Exceedances - Assessing Water Quality Compliance for Central Valley Phase I Municipal Stormwater Discharge
Big Bear Room	Don't Trash Fresno Public Education Research Study (PERS) Using Technical Data and Marketing Research to Change Behavior
Lake Silverwood Room	Program Assessment - The Need for Quantifiable Measurements
LUNCHEON PRESENTATIONS	**12:00 PM - 1:30 PM**
Vineyard Room	Dealing with Last Year's Record Southern California Rainfall
SESSION 9	**1:30 PM - 2:30 PM**
Lake Gregory Room	Pilot Study to Full Scale Implementation: How to Design a Trash Capture Device for California Freeways One Solution for Meeting LA's Trash TMDL; Utilization of Louvered Linear Radial Screen for Gross Solids Removal
Lake Silverwood Room	Caltrans Vegetation Erosion Control Research and Seed Selection Tool Testing and Quality Control of Seed for Erosion Control
Big Bear Room	Municipal Strategies for Implementing TMDLs: The Florida Perspective An Integrated, Iterative, Adaptive Approach to TMDL Implementation for Santa Monica Bay Jurisdictions 1 and 4
Strawberry Peak Room	CASQA Public Information and Education Resources Directory
Session 10	**2:45 PM - 3:45 PM**
Lake Gregory Room	Selenium Treatment and Management
Lake Silverwood Room	Santa Barbara County Urban Runoff Treatment Control Project
Big Bear Room	Development of Treatment Processes for Removing Turbidity and Phosphorus at Lake Tahoe
Strawberry Peak Room	Ballona Creek Watershed BMP Retrofit Study - Phase 1: Conceptual Planning

CASQA Conference 2005

HYDROMODIFICATION WORKSHOP AGENDA

Lake Silverwood Room

8:30 A.M. – 8:40 A.M.

Welcome and Opening Remarks
Chris Crompton
SMC Chair

8:40 A.M. – 9:15 A.M.

Introduction to Hydromodification
Jeff Haltiner
Philip Williams and Associates

9:15 A.M. – 10:15 A.M.

Why is Hydromodification such a big deal?
(Mini-panel discussion)

Policy Perspective
Susan Cloke
Los Angeles Regional Water Quality Control Board

Regulatory Perspective
John Robertus
San Diego Regional Water Quality Control Board

Homebuilders Perspective
Marolyn Parson
National Association of Home Builders

Natural Resource Perspective
Shelley Luce
Santa Monica Bay Restoration Commission

10:15 A.M. – 10:30 A.M.

BREAK

10:30 A.M. – 12:30 P.M.

Hydromodification Research and Studies

Risk-Based Channel Stability Analysis for Urbanizing Watersheds
Brian Bledsoe
Colorado State University

Changes in Streamflow Patterns from Urbanization - A Humid-Region Perspective
Derek Booth
Univ. of Washington

Modeling Urbanization Impacts and Channel Stability in Ventura County
Tony Donigian
Aqua Terra

Southern California Peak Flow Study Results and Conclusions
Craig MacRae
Aquafor Beech

Santa Clara Valley HMP Studies
Gary Palhegyi
GeoSyntec

12:30 P.M. – 1:30 P.M.

LUNCH BREAK

Buffet, Dinning in the Vinyard Room

1:30 P.M. – 2:15 P.M.

Regulatory Response to Hydromodification
Northern California perspectives
Larry Kolb
San Francisco Regional Water Board

Southern California Perspectives
Xavier Swamikannu,
LA Regional Water Board

2:15 P.M. – 3:30 P.M.

Implementation of Hydromodification Management Practices
Dan Cloak
Contra Costa County

Santa Clara Valley
Jill Bicknell,
Santa Clara Valley Urban Runoff Program

Newhall Land and Farming
Mark Sobotin
Newhall Land and Farming

Control of Hydromod Through Land Planning
Laura Eisenberg
Rancho Mission Viejo

3:30 P.M. – 4:30 P.M.

Panel discussion on Implementation Issues
Facilitated by: Chris Crompton

Matt Yeager
San Bernardino Co. Flood Control District

Rene DeShazo
Los Angeles Regional Water Quality Control Board

Mark Abrahamson
Heal the Bay

Marolyn Parson
National Association of Home Builders

Jeff Haltiner
Philip Williams and Associates

Jill Bicknell
Santa Clara Valley Urban Runoff Program

Pre-Conference Workshop 2
Monday 8:30 AM – 4:00 PM

Lake Gregory Room
NPDES Inspection Training

California Water Environment Association

A full day of NPDES inspection training will be provided by CASQA member trainers and guest California Water Environment Association (CWEA) trainers who are experts in the topics of construction, industrial, and commercial NPDES inspections. Training is designed to educate municipal staff upon the elements of inspection, documentation, record keeping, and proper and improper implementation of stormwater Best Management Practices (BMP). An overview of recent inspection findings in California will be provided.

Moderator:
Daniel Rourke
Fresno Metropliton Flood Control District

8:30 AM – 10:00 AM

Industrial / Commercial Facility Inspection Training – Part 1

CWEA Trainers:
Steve Aguiar
City of Livermore

and

Daryl Hartwill
City of Riverside

Pre-Inspection Preparation
SWPPP Review
Inspection Training Video

Morning Break
10:00 AM – 10:15 AM

10:15 AM – 11:25 AM

Industrial / Commercial Facility Inspection Training – Part 2

CWEA Trainers:
Steve Aguiar
City of Livermore

and

Daryl Hartwill
City of Riverside

Site Inspection
Sampling Procedures
Inspection Documentation
Enforcement Procedures and Referral

11:25 AM - 12:00 PM

Overview of California Industrial Inspection Findings
John Kosco, P.E. CPESC
Principal Engineer
Tetra Tech

Lunch
12:00 PM - 1:00 PM
Buffet, Dinning in the Vineyard Room

1:00 PM – 2:30 PM

Construction Site Inspection Training – Part 1

Trainers:
Melinda McCoy, R.G. — *CDM*
Luis Leon, P.E. — *CDM*

Pre-inspection Preparation
SWPPP Review
Inspection Training Video

Afternoon Break
2:30 PM – 2:45 PM

2:45 PM – 3:25 PM

Construction Site Inspection Training – Part 2

Trainers:
Melinda McCoy, R.G. — *CDM*
Luis Leon, P.E. — *CDM*

Site Inspection
Inspection Documentation
Enforcement Procedures and Referral

3:25 PM - 4:00 PM

Overview of California Construction Inspection Findings

John Tinger
USEPA Region 9

TUESDAY
October 4, 2005

7:30 AM: Open Registration

8:00 AM: Exhibit Opening

8:30 AM – 9:30 AM

Conference Opening
Vineyard Room

Welcoming:
Karen Ashby
Chair, and CASQA Board of Directors

Opening Remarks and Introductions

Keynote Address: Mistakes of the Past, Promises of the Future
Doug Harrison
Founding CASQA Chair

Mr. Harrison has been recognized by the American Public Works Association with its "Top Ten Public Works Leaders of the Year Award", the "Excellence in Water Leadership Award" by the Association of California Water Agencies, with a recognition of appreciation by the State Water Resources Control Board, with the "General Manager of the Year Award" of the California Special Districts Association, and was awarded the first "Leadership Award" of the California Storm Quality Association

** *Note: Within time sessions (1-10), presentations run in parallel organized along these four tracks: Stormwater – Treatment Track; Operations Track; Research Track; and Management Track* **

9:30 AM – 10:30 AM
Session 1

Strawberry Peak Room
Treatment Track

Stormwater Chemical Dosing System Development
Jeff Lawrence
URS

The Caltrans Route 73 BMP Pilot Study
Gary Friedman
Metcalf & Eddy

Lake Silverwood Room
Operations Track

Riverside County's IC/ID Program
Linda C. Garcia
Riverside County Flood Control

Mobile Pressure Washers, Complying with Stormwater BMPs
Regan S. Bailey
Wastewater Resources Analyst

Nicole Green
Environmental Compliance Inspector II
City of Riverside

Big Bear Room
Research Track

Life After Diazinon – What's New for Urban Creeks
Armand Ruby
Armand Ruby Consulting

The Increasing Environmental Significance of Pyrethroid Pesticides & Pyrethroid Pesticide Analyses at Environmentally Relevant Levels
Pete W. Halpin
Caltest Analytical Laboratory

Lake Gregory Room
Management Track

Development of a Hydromodification Management Plan for the Santa Clara Valley Part 1: Performance Criteria and Guidance for Local Implementation
Jill C. Bicknell, P.E.
Assistant Program Manager
EOA, Inc
Santa Clara Valley Urban Runoff Pollution Prevention Program

Development of a Hydromodification Management Plan for the Santa Clara Valley – Part 2: Assessment of Hydromodification Impacts and Control Measure Effectiveness
Gary Palhegyi
Senior Professional
GeoSyntec

10:30 AM – 11:00 AM
Morning Break

11:00 AM – 12:00 PM
Session 2

Strawberry Peak Room
Treatment Track

Post-Project Monitoring of BMPs/SUDs to Determine Performance and Whole-Life Costs
Michael Barrett, Ph.D.
University of Texas

Lake Silverwood Room
Treatment Track

Treatment Trains: Don't Get Run Over
Gary R. Minton, Ph.D., P.E.
Resource Planning Associates

Performance, Maintenance and Cost of Full Sedimentation vs. Partial Sedimentation Sand Filters
David Alderete
Office of Water Programs
California State University Sacramento

Big Bear Room
Research Track

Characterization of Runoff from the Sacramento Urban Area
Bill Busath
City of Sacramento

A Watershed Scale Approach to Estimating Pollutant Loading from Dry Season Urban Runoff
Dustin Bambic
Larry Walker Associates

Lake Gregory Room
Management Track

Hydrograph Modification Management Using Simplified Low Impact Development Design
Christie Beeman, P.E.
Senior Associate
Philip Williams and Associates

12:00 PM – 1:30 PM

Luncheon Presentation

In the Vineyard Room

CASQA Awards and Recognition Program

The CASQA Board of Directors recognizes that individuals and organizations play a key role in furthering the educational, technical, and scientific initiatives that advance stormwater quality management, science, and regulation. Furthermore, the Board has determined that certain individuals and organizations display exemplary leadership, excellence, and initiative in advancing stormwater quality management, science, and regulation, and that the purpose of CASQA can be better achieved by formally recognizing these individuals and organizations.

Therefore, the Board has established the CASQA Awards and Recognition Program to recognize excellence in the above-mentioned areas.

During the luncheon CASQA will recognize individuals and organizations that show exemplary leadership, courage, excellence, or initiative in advancing stormwater quality management, science, and regulation consistent with CASQA's mission.

1:30 PM – 2:30 PM

Session 3

Strawberry Peak Room

Treatment Track

A New Method for Estimating Runoff Quantities for Flow and Volume-based BMP Design
William R. Lanton
Department of Geological Sciences
California State University, Fullerton

Lake Silverwood Room

Management Track

Collaboration & Integration Opportunities for Stormwater Programs
Stephen McCord
Senior Engineer
Larry Walker Associates

Stormwater Monitoring Coalition: A Regional Approach to Research/Monitoring in Southern California
Chris Crompton
Manager, Environmental Resources
County of Orange/Watershed & Coastal Resources

Big Bear Room

Research Track

Management of Pathogens Associated with Stormwater Discharges: Methodology and Application for Molecular Detection of Target Organisms Combined with Microbial Source Tracking
Professor Stefan Wuertz
Department of Civil and Environmental Engineering
University of California, Davis

First Flush Phenomenon
Masoud Kayhanian
Associate Director
Center for Environmental and Water Resources Engineering
Department of Civil and Environmental Engineering
University of California, Davis

Lake Gregory Room

Management Track

The Role of Economic Considerations in Stormwater Permits
John J. Lormon,
Partner
Procopio Cory Hargreaves & Savitch LLP

Stormwater – A Federal Legal Update
Elizabeth (Nena) Shaw, Esq.
Hunton & Williams LLP

2:30 PM – 2:45 PM

Afternoon Break

2:45 PM – 3:45 PM

Session 4

Lake Gregory Room

Treatment Track

Simplified Low Impact Development Design for Compliance with Stormwater Treatment Requirements
Dan Cloak, P.E.
Principal
Dan Cloak Environmental Consulting

A Lower-Impact Development Approach for a Coastal Resort in Southern California
Eric W. Strecker
GeoSyntec

Lake Silverwood Room

Management Track

Arroyo Seco Watershed Plan: Strategic Water Quality Implementation
Ken Susilo, P.E., CPSWQ
GeoSyntec Consultants
Brandon Steets

The Nitrogen and Selenium Management Program for the San Diego Creek and Newport Bay Watershed: An Alternative Compliance Approach to Waste Discharge Requirements
Karen Hauptly
County of Orange

Big Bear Room

Research Track

The World According to TAPE: A Journey Through the Washington State Department of Ecology's Approval Process
Vaikko Allen
Stormwater Management Inc.

Strawberry Peak Room
Management Track

Strategies for New Revenue for Stormwater Management: California Case Studies.
John W. Bliss, P.E.
Vice President
Shilts Consulting

4:00 PM – 5:00 PM
Session 5

Lake Gregory Room
Treatment Track

The Effects of Infiltrating Stormwater On Soils and Groundwater
Scott Meyer
Office of Water Programs

Countywide Stormwater Infiltration Site Characterization Criteria and Guidance Study, Contra Costa Clean Water Program
Lucas W. Paz, Ph.D.
Senior Hydrologist
LFR Levine - Fricke
Michael S. Thomas, P.E.
Principal Engineer
LFR Levine - Fricke

Lake Silverwood Room
Management Track

Evaluation of Recreational Uses and Bacteria Water Quality Objectives in the Santa Ana River Watershed
Richard Meyerhoff, Ph.D.
CDM

Big Bear Room
Management Track

An Innovative Approach for Protecting the San Diego Marine Life Refuge: A Prototype Model for ASBS Management
Nathan J. Schaedler, P.E.
Project Manager
MACTEC

Strawberry Peak Room
Management Track

Rancho Mission Viejo Water Quality Management Plan
Peter Mangarella, P.E., Ph.D.
Associate
GeoSyntec Consultants, Oakland, CA

Laura Coley Eisenberg
Director, Planning and Entitlement
Rancho Mission Viejo
San Capistrano

5:30 PM – 7:30 PM
Exhibitor Hosted Reception
In the Harvest and Grove Room
Join us in the Exhibitor's Hall for Drinks and Appetizers

Wednesday October 5, 2005

7:30 AM: Open Registration
8:00 AM: Exhibit Opening
8:30 AM – 9:30 AM
Session 6

Lake Gregory Room
Treatment Track

LEED Requirements: From a Hydrology and Drainage Design Perspective
Eliza Jane Whitman, P.E.
Inland Empire Utilities Agency (IEUA)

Sun Valley Park Stormwater Infiltration Basin Demonstration Project
Kathleen Higgins
CH2M Hill

Strawberry Peak Room
Management Track

The Storm Water Data Report: How Caltrans Documents Compliance in the Design Phase
Timothy B. Sobelman, P.E.
Chief – Office of Stormwater Management
California Department of Transportation

Using Web Technology to Improve MS4 Regulatory Reporting
Jon Spangenberg
CDM

Big Bear Room
Research Track

Solid Measurements in Stormwater Runoff
Masoud Kayhanian
Associate Director
Center for Environmental and Water Resources Engineering
Department of Civil and Environmental Engineering
University of California, Davis

Design of BMPs for Contaminants Removal with respect to Small Particle Size Distribution
Masoud Kayhanian
Associate Director
Center for Environmental and Water Resources Engineering
Department of Civil and Environmental Engineering
University of California, Davis

Lake Silverwood Room
Management Track

Evaluation of Municipal Stormwater Programs Implemented Throughout California
Pamela Creedon
Tetra Tech

Evaluation of New Development Standards for Municipal Stormwater Programs in Southern California
John Kosco, P.E. CPESC
Principal Engineer
Tetra Tech

9:30 AM – 9:45 AM
Morning Break

9:45 AM – 10:45 AM
Session 7

Lake Gregory Room
Treatment Track

Performance of a California Wet Pond
Gary Shawley
Alameda County

Stormwater Treatment: Can We Make Them Smaller?
Gary R. Minton
Resource Planning Associates

Lake Silverwood Room
Research Track

Analyses of the Expanded International BMP Database and Implications for BMP Selection and Design
Eric W. Strecker
GeoSyntec

Big Bear Room
Management Track

Basin Sizer: A Free Software Tool for Determining Water Quality Volumes and Water Quality Flows
Scott Meyer
Office of Water Programs

Finding Water Body Information Using the Water Quality Planning Tool Web Site
Scott Meyer
Office of Water Programs

Strawberry Peak Room
Management Track

LID Techniques and Water Quality Management Plans for Water Quality Control in New Development and Redevelopment
Jeffery D. Endicott, P.E., DEE
Engineering Director
AEI-CASC Engineering Inc.

11:00 AM – 12:00 PM
Session 8

Lake Gregory Room
Treatment Track

Tahoe Basin BMP Evaluation and Feasibility Study
Eric W. Strecker
GeoSyntec

Effort to Keep Lake Tahoe Blue
Sara A. McIlory
Stantec

Strawberry Peak Room
Management Track

Using A Water Quality Database as a Stormwater Program Management Tool
Mike Trouchon
Senior Scientist
Larry Walker Associates

Report of Water Quality Exceedances – Assessing Water Quality Compliance for Central Valley Phase I Municipal Stormwater Dischargers
Brian Laurenson, P.E.
Senior Engineer
Larry Walker Associates

Big Bear Room
Research Track

Don't Trash Fresno Public Education Research Study (PERS)
Misha Gutierrez
Ogilvy, PR

Using Technical Data and Marketing Research to Change Behavior
Stephen Groner, P.E.
President
S. Groner & Associates Inc.

Lake Silverwood Room
Management Track

Program Assessment – The Need for Quantifiable Measurements
Betsy Elzufon
CASQA

12:00 PM – 1:30 PM

Lunch in the Vineyard Room

Luncheon Presentation

Dealing with Last Year's Record Southern California Rainfall - Impact and Agency Response

Guest luncheon speakers from Southern California water resources agencies will present impacts and challenges related to managing the previous wet season's record rainfall and resulting stormwater runoff. Guest luncheon speakers include:

Vana Olson
San Bernardino County Department of Public Works

Herb Nakasone
Director Public Works / Chief Engineer, Resources & Development Management Department, County of Orange

Warren "Dusty" Williams
General Manager / Chief Engineer, Riverside County Flood Control and Water Conservation District

1:30 PM – 2:30 PM

Session 9

Lake Gregory Room

Treatment Track

Pilot Study to Full Scale Implementation: How to Design A Trash Capture Device for California Freeways
Timothy B. Sobeman, P.E.
Supervising Transportation Engineer
Chief-Office of Stormwater Management-Design

One Solution for Meeting LA's Trash TMDL; Utilization of Louvered Linear Radial Screen for Gross Solids Removal
Kevin McGillcuddy
Director, Stormwater Treatment Division
Roscoe Moss Company

Lake Silverwood Room

Research Track

Caltrans Vegetation Erosion Control Research and Seed Selection Tool
Misty Scharff
Office of Water Programs

Testing and Quality Control of Seed For Erosion Control
Randy Marx
Brown & Caldwell

Big Bear Room

Management Track

Municipal Strategies for Implementing TMDLs: The Florida Perspective
Michael Batemen
Vortechnics Inc.

An Integrated, Iterative, Adaptive Approach to TMDL Implementation for Santa Monica Bay Jurisdictions 1 and 4
Ken Susilo
GeoSyntec

Strawberry Peak Room

Management Track

CASQA Public Information and Education Resources Directory
Sharon Gosselin
CASQA

2:30 PM – 2:45 PM

Afternoon Break

2:45 PM – 3:45 PM

Session 10

Lake Gregory Room

Research Track

Selenium Treatment and Management Approaches
Ken Susilo
GeoSyntec

Lake Silverwood Room

Treatment Track

Santa Barbara County Urban Runoff Treatment Control Project

Peter Mangarella, P.E., Ph.D.
Associate, GeoSyntec Consultants Oakland, CA

Cathleen Garnand, P.E.
Civil Engineering Associate
Santa Barbara County Water Agency

Craig Steward, P.E.
Principal Engineer
Penfield & Smith

John Gray
URS Corporation

Big Bear Room

Research Track

Development of Treatment Processes for Removing Turbidity and Phosphorus at Lake Tahoe
Depen Patel
Office of Water Programs

Strawberry Peak Room

Management Track

Ballona Creek Watershed BMP Retrofit Study – Phase I: Conceptual Planning
Lisa Austin, P.E.
GeoSyntec

A New Method for Estimating Runoff Quantities for Flow and Volume-based BMP Design

W. Richard Laton, California State University, Fullerton
Ted Hromadka, US Military Academy, West Point
Matt Yeager, San Bernardino County Flood Control
Jack A. Picciuto, US Military Academy, West Point
Bob Whitely, University of California, Irvine

Module 25; Day 1; Session 3

Introduction

- Controlling rainfall runoff is an important process for City, County and State Agencies because large concentrations of pollutants are typically found in runoff from small volume storms and from the first flush of larger storms. The ability to quantify the magnitude of rainfall in any give area without conducting a large-scale hydrologic study will aid managers and individuals throughout the United States.

BMPs

- A BMP design criterion for management of stormwater from rainfall events is broken into two types; volume-based and flow-based.
  - A volume-based BMP design calls for the capture and infiltration or treatment of a certain percentage of the runoff from the project site, usually in the range of the 75th to 85th percentile average annual runoff volume. This range corresponds to the "knee of the curve".
  - A low flow based BMP design criteria calls for the capture and infiltration or treatment of runoff produced by rain events in excess of 0.2 inches/hour.

Study Approach

- Analysis was conducted to discern if there exists a statistical link between rainfall frequency distribution and the NOAA Atlas 14.
- Idea was to develop a statistical approach to compare rainfall data with overwhelming number of storms to simple correlations.
- In areas where no rainfall gauges exist, this analysis could provide the mechanism to establish a correlation between the NOAA Atlas and the expected cumulative frequency curves.
- Note: This approach can be applied throughout the United States where NOAA has completed analyses similar to the Atlas 14 study conducted for the southwestern United States (Geoffrey, M.B., et al., 2004).

Rainfall Station Information

Total Number of rainfall stations	Total number of daily stations	Total number of hourly stations	Total number of 15 minute stations	Total number of hourly stations used in study
655	544	227	27	90

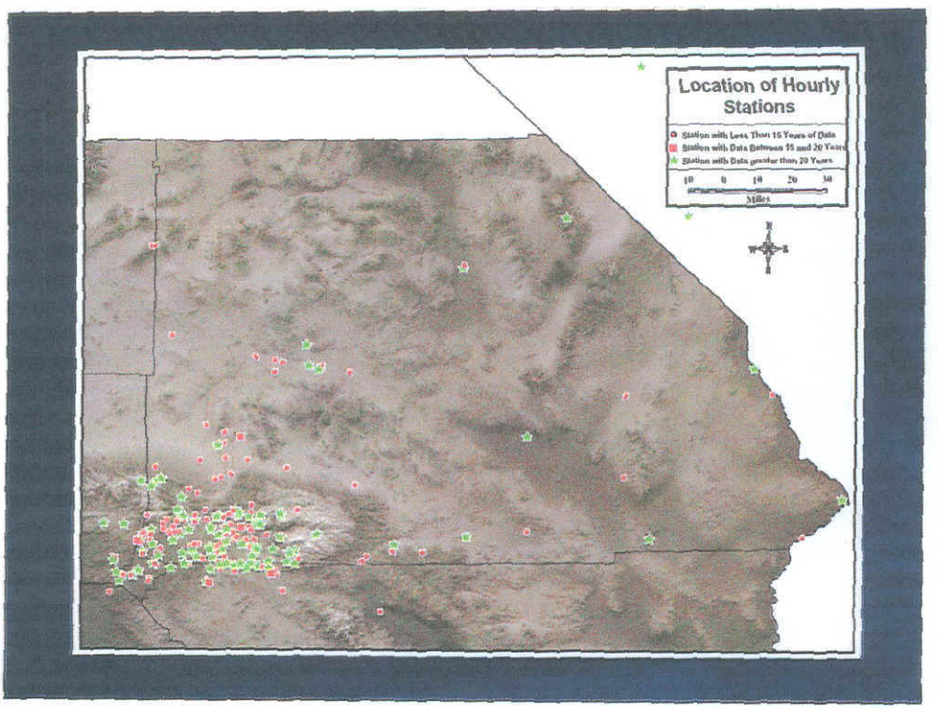
Table 1: General Rainfall Station Information.

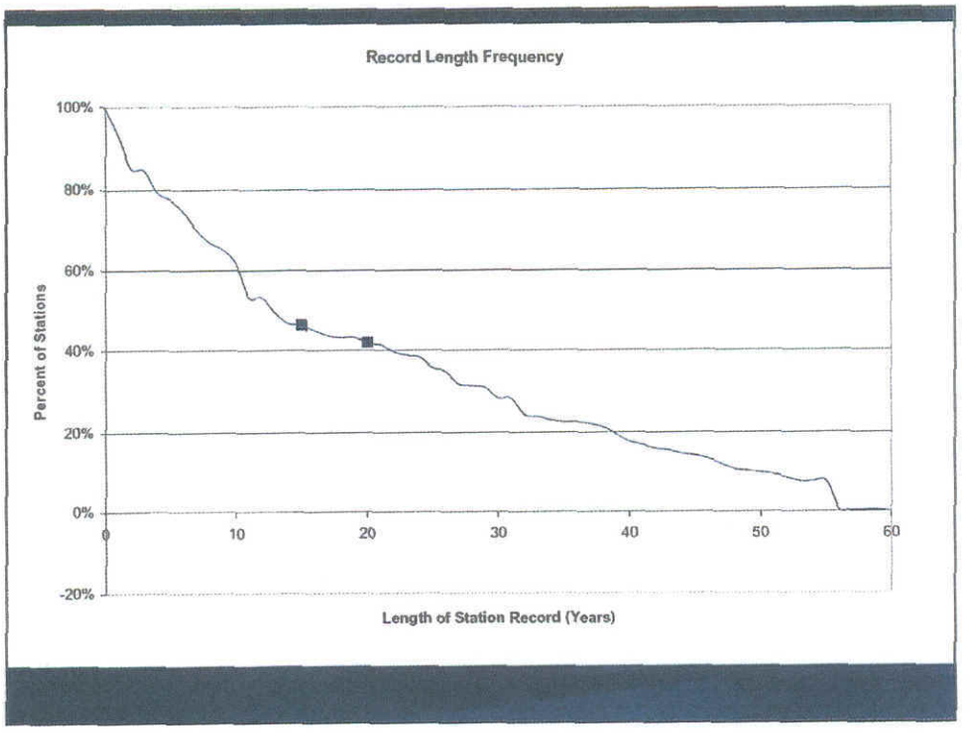
Total number of hourly stations	NOAA	San Bernardino County	CIMIS	UC Davis
227	45	173	9	0

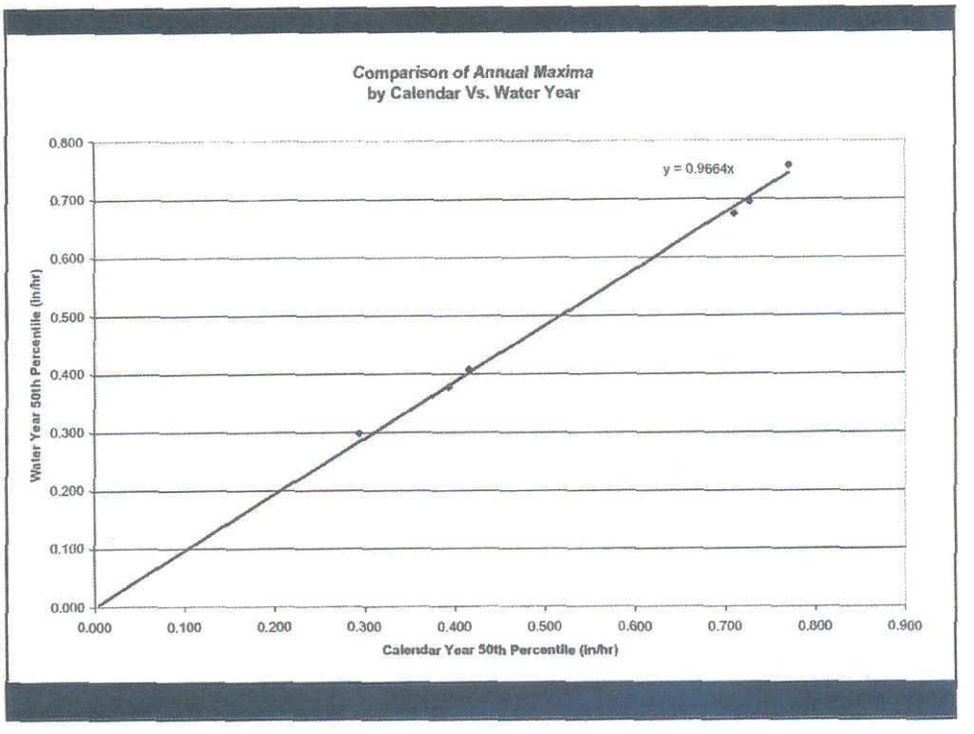
Table 2: Source of Hourly Data.

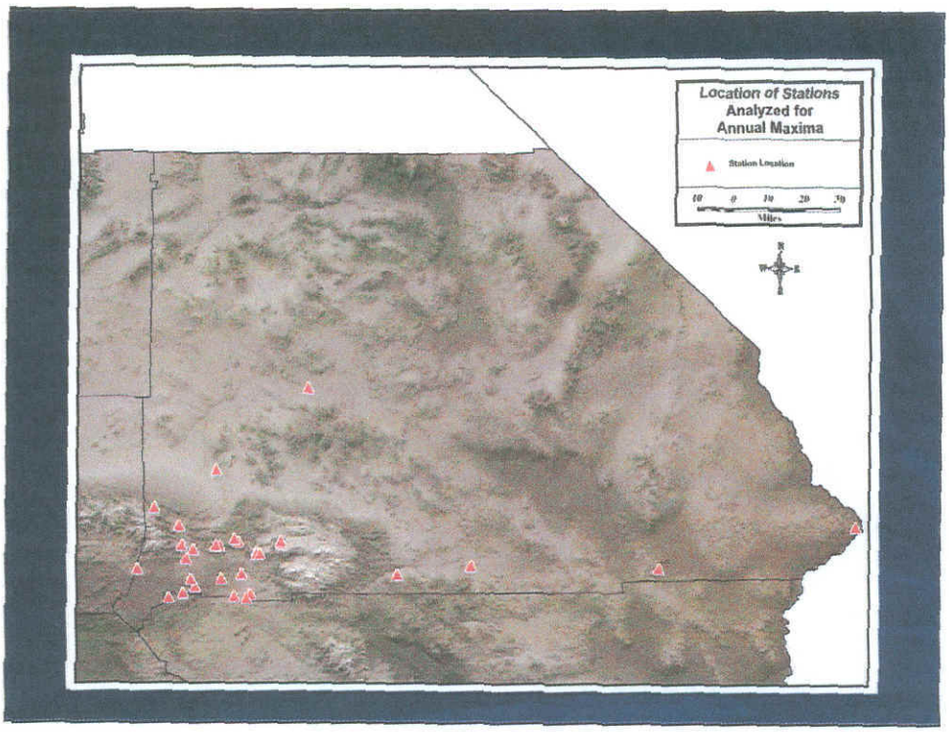
Total hourly stations used in study	San Bernardino County	Riverside County	Los Angeles County	Nevada
90	82	2	4	2

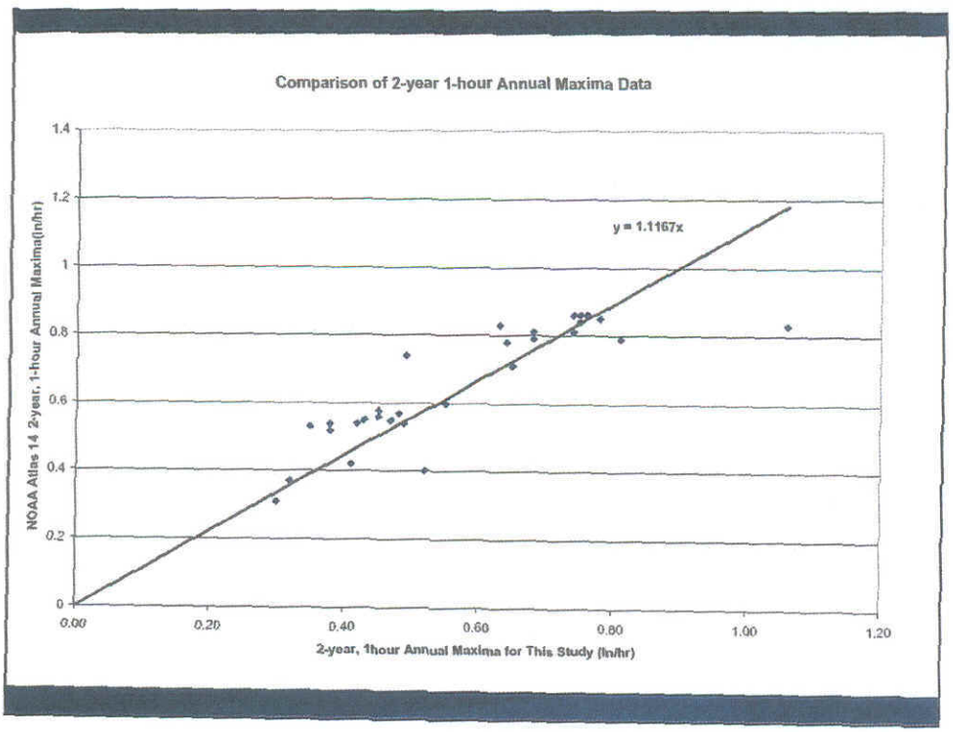
Table 3: Location of Hourly Data.

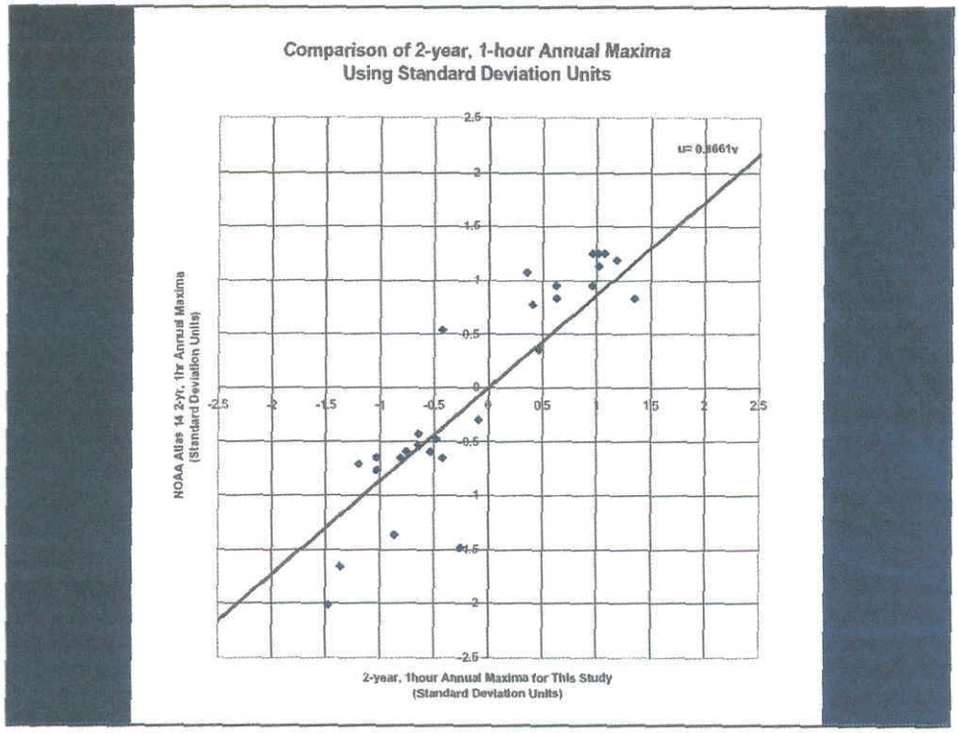


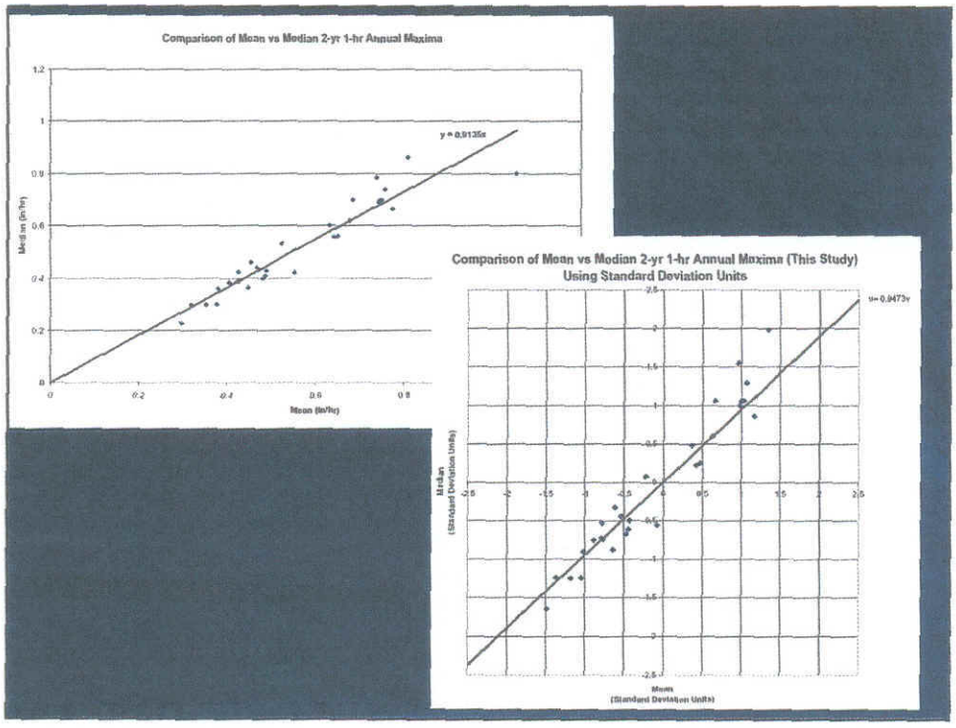

Record Length Frequency
100%
80%
60%
40%
20%
0%
-20%
Percent of Stations
0
10
20
30
40
50
60
Length of Station Record (Years)


Comparison of Annual Maxima
by Calendar Vs. Water Year
y = 0.9664x
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
Water Year 50th Percentile (in/hr)
0.000
0.100
0.200
0.300
0.400
0.500
0.600
0.700
0.800
0.900
Calendar Year 50th Percentile (in/hr)


Location of Stations
Analyzed for
Annual Maxima
Station Location
Miles

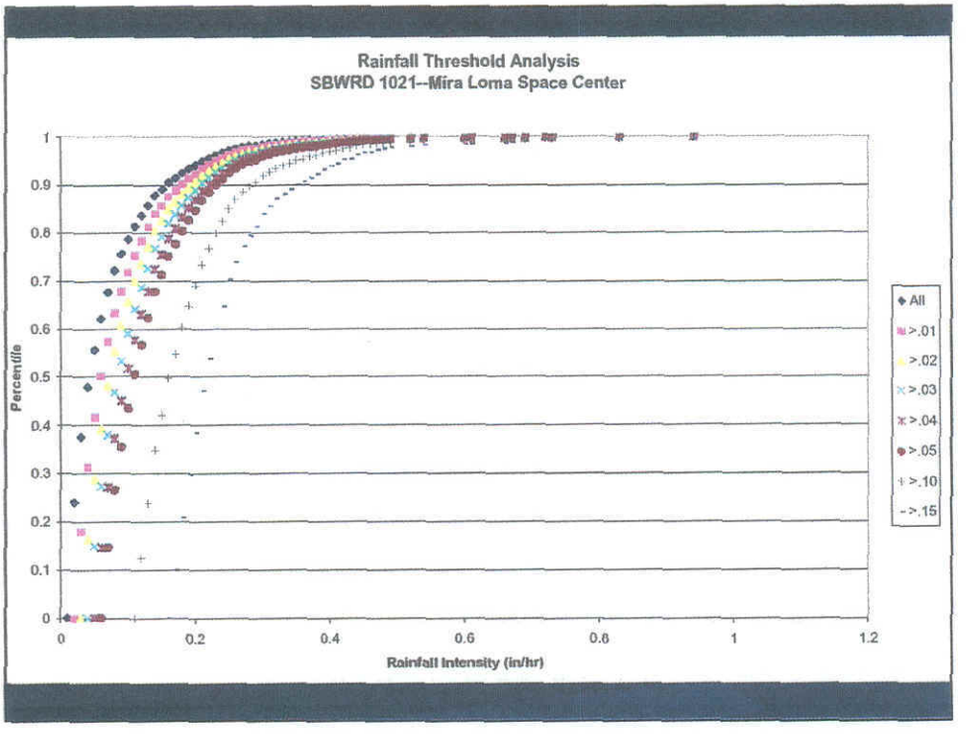

Comparison of 2-year 1-hour Annual Maxima Data
NOAA Atlas 14 2-year, 1-hour Annual Maxima(in/hr)
2-year, 1hour Annual Maxima for This Study (in/hr)
y = 1.1167x
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0.00
0.20
0.40
0.60
0.80
1.00
1.20

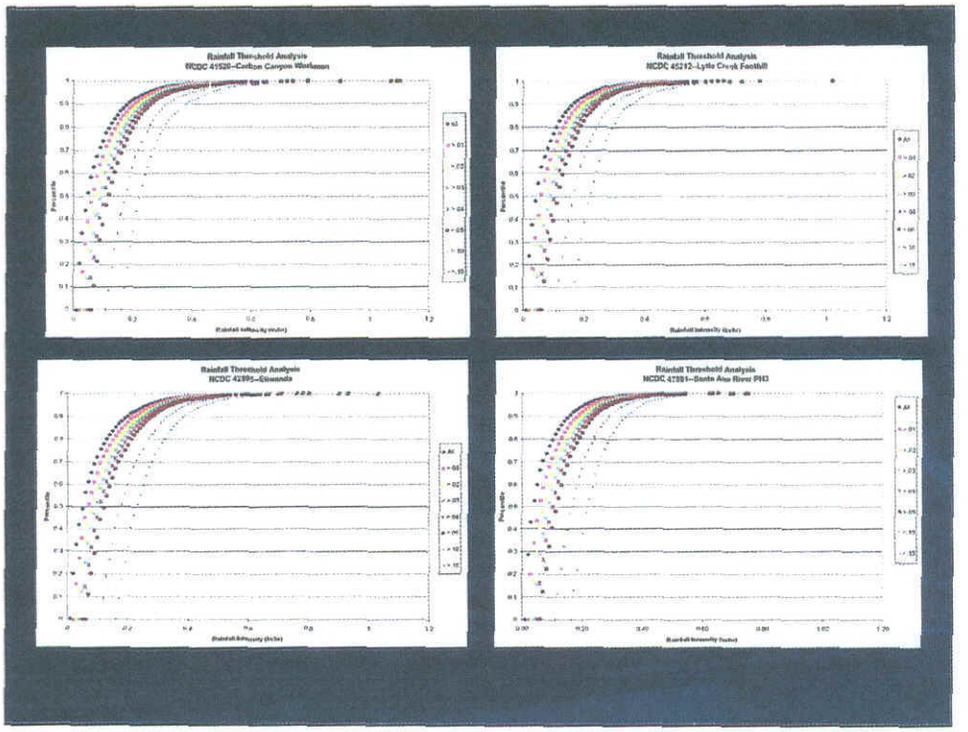

Comparison of 2-year, 1-hour Annual Maxima
Using Standard Deviation Units
y= 0.8661x
NOAA Atlas 14 2-yr, 1hr Annual Maxima
(Standard Deviation Units)
2-year, 1hour Annual Maxima for This Study
(Standard Deviation Units)


Comparison of Mean vs Median 2-yr 1-hr Annual Maxima
y = 0.9135x
Median (in/hr)
Mean (in/hr)
Comparison of Mean vs Median 2-yr 1-hr Annual Maxima (This Study)
Using Standard Deviation Units
y= 0.9473x
Median
(Standard Deviation Units)
Mean
(Standard Deviation Units)

Sensitivity Analysis

- Sensitivity analysis was run by filtering out data of less than equal to 0.01, 0.02, 0.03, 0.04, 0.05, 0.10, and 0.20 inches and re-percentile ranked.
- The recognized variance was a subtle shift of the curves to the right (increased rainfall intensity).
- The elimination of 0.01 values is custom and practice for these type of analysis (Miller, R.H., et al., 1973; Geoffrey, M.B., et al., 2004; and State of California BMP manual, 2004).

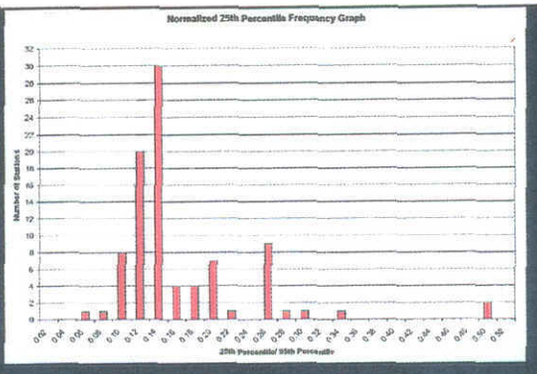




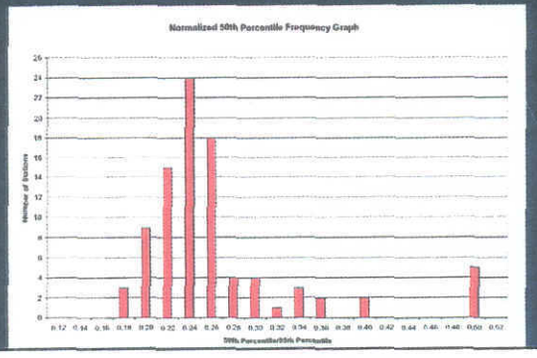
Characteristic Ratios

- Pattern of regionality
- All graphs suggest a normal distribution
- The 50th percentile graph corresponds to a resistant statistic (mean) and therefore is not subject to effects in the changes of magnitude by the largest and smallest values.

25th



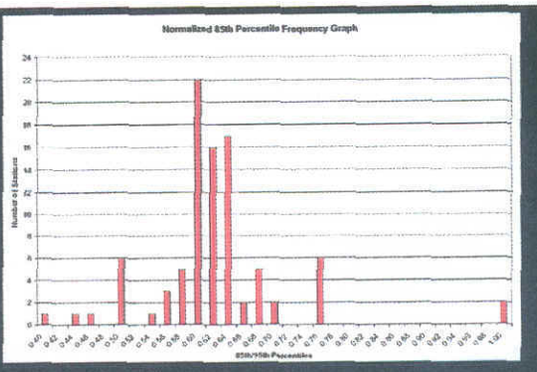
50th



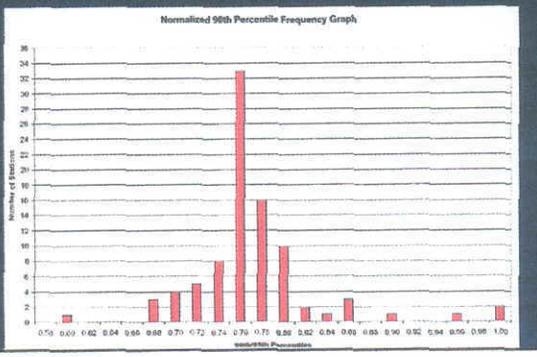
70th

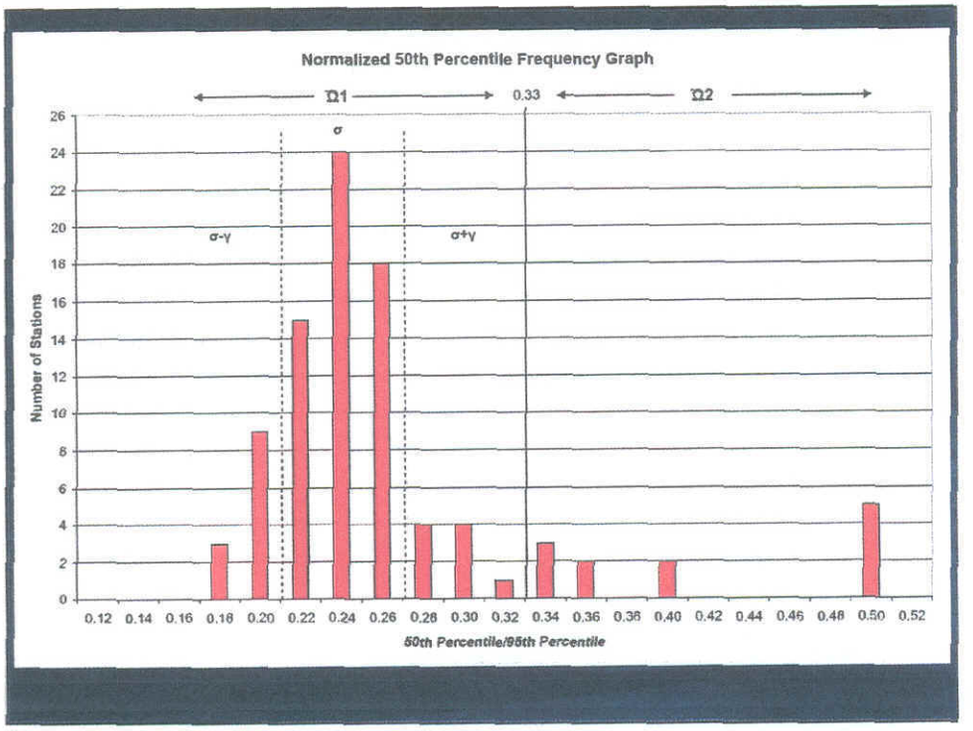
75th

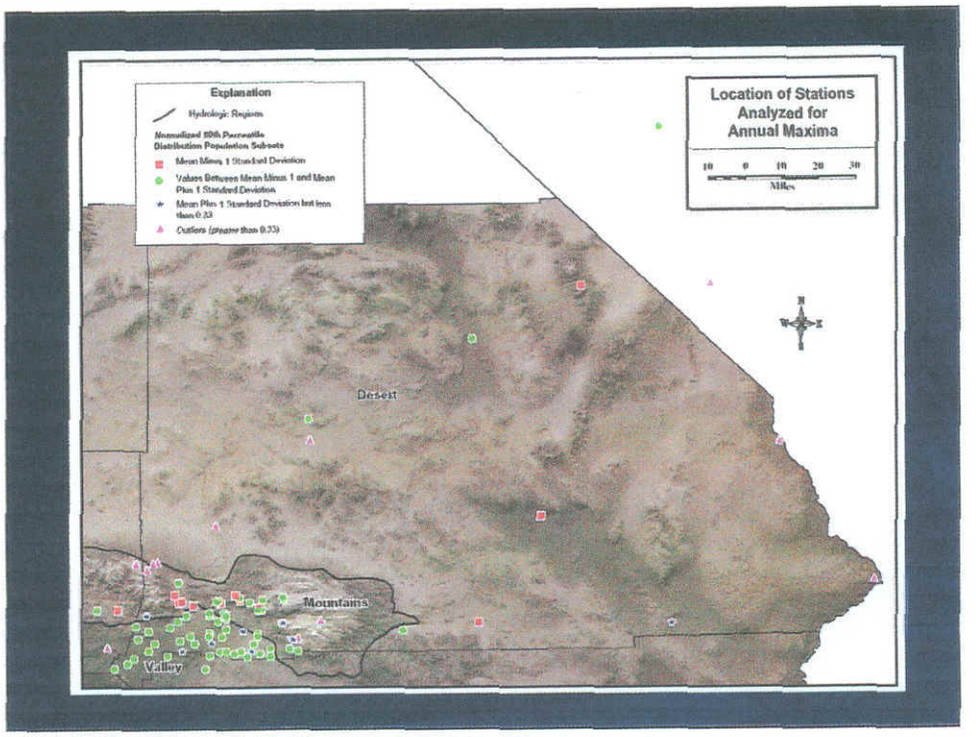
85th


Normalized 85th Percentile Frequency Graph
Number of Stations
85th/95th Percentiles

90th

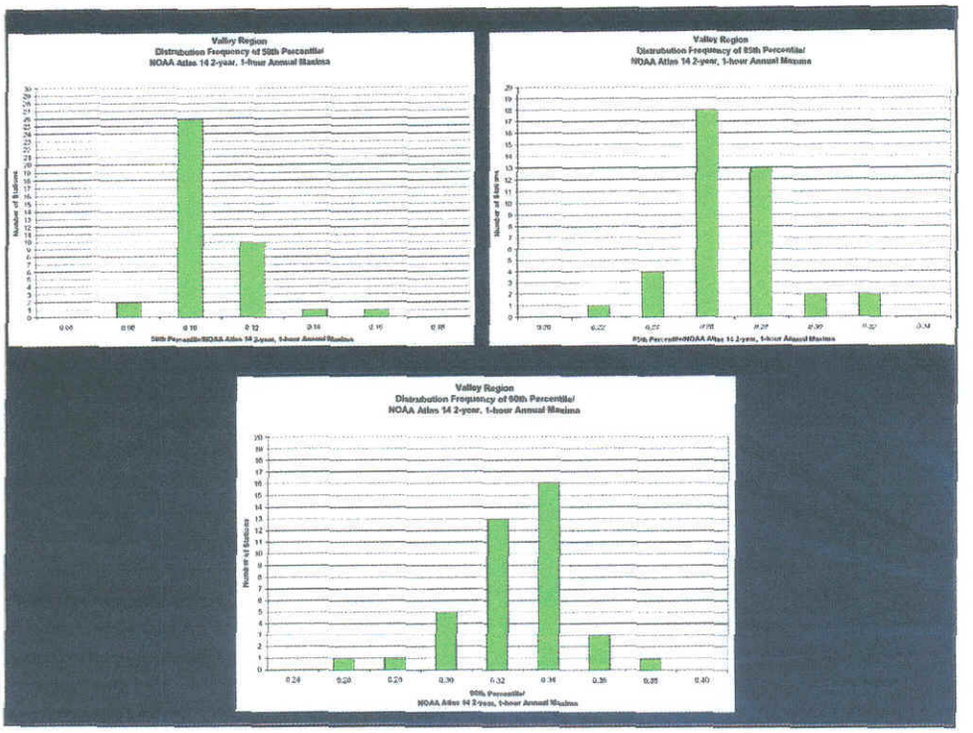

Normalized 90th Percentile Frequency Graph
Number of Stations
90th/95th Percentiles

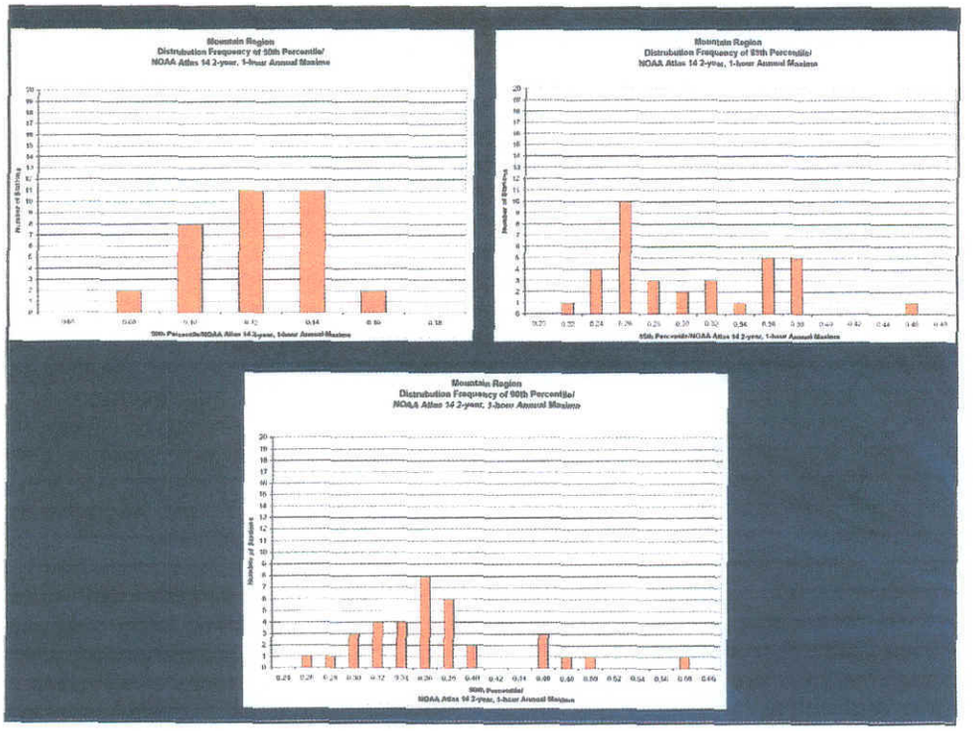

Normalized 50th Percentile Frequency Graph
Ω1
0.33
Ω2
σ
σ-γ
σ+γ
Number of Stations
50th Percentile/95th Percentile

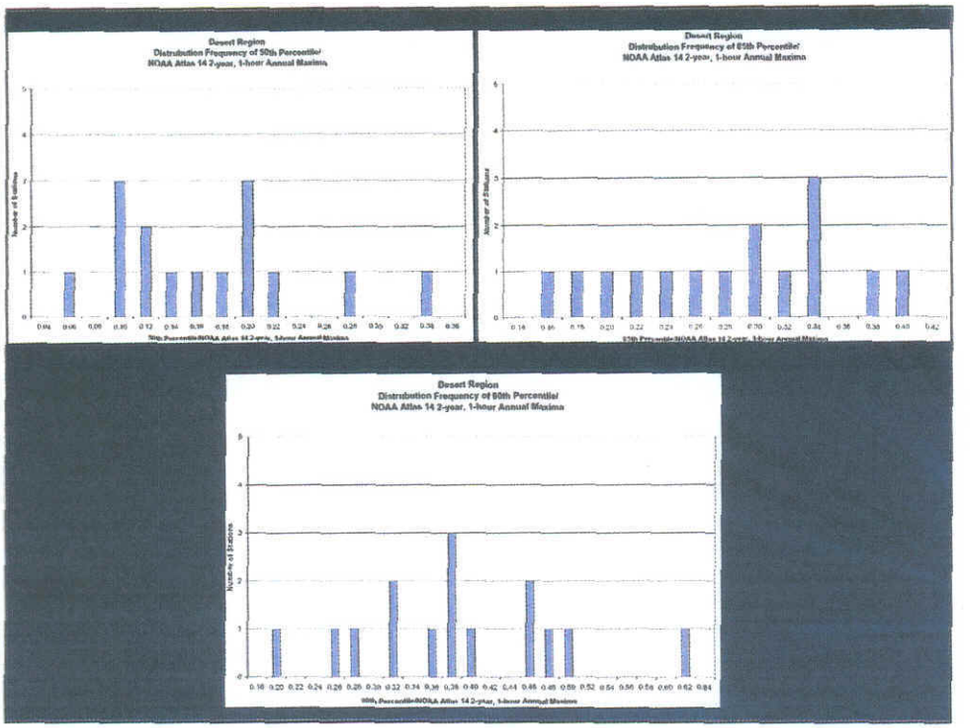


Percentile Counts versus NOAA Atlas 14, 2-yr 1-hour Rainfall Data

- Nearly all the hourly rainfall data (99%) is less than that of NOAA Atlas 14, 2-yr 1-hour rainfall intensity values
- All data normalized to the 95th percentile
- Data plotted by region

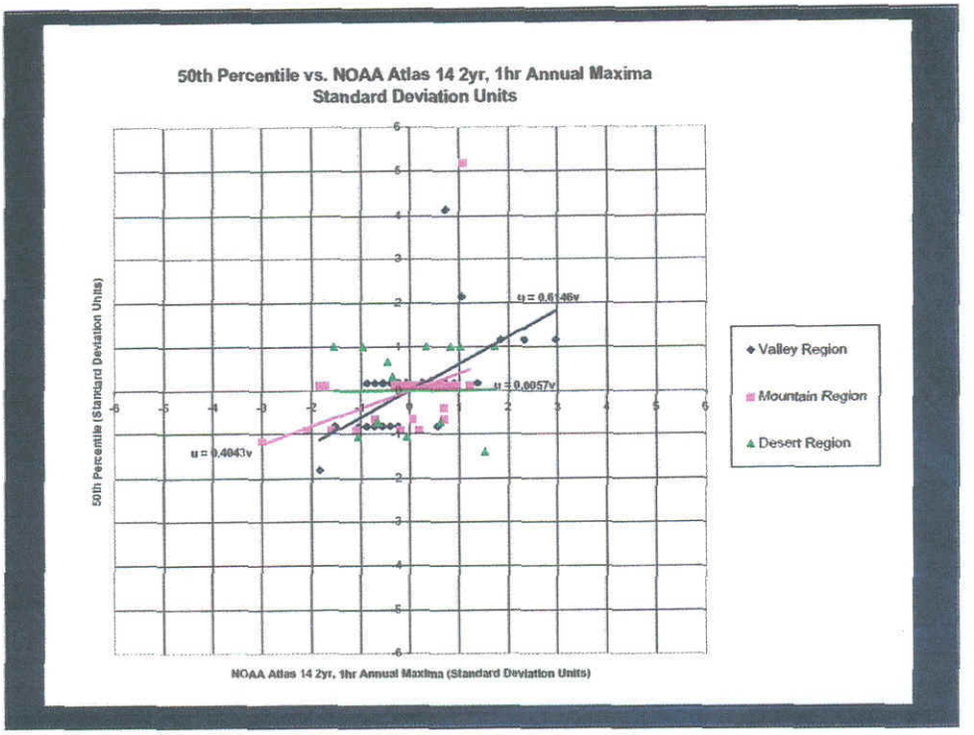

Valley Region
Distribution Frequency of 50th Percentile/
NOAA Atlas 14 2-year, 1-hour Annual Maxima
Number of Stations
50th Percentile/NOAA Atlas 14 2-year, 1-hour Annual Maxima
Valley Region
Distribution Frequency of 85th Percentile/
NOAA Atlas 14 2-year, 1-hour Annual Maxima
Number of Stations
85th Percentile/NOAA Atlas 14 2-year, 1-hour Annual Maxima
Valley Region
Distribution Frequency of 90th Percentile/
NOAA Atlas 14 2-year, 1-hour Annual Maxima
Number of Stations
90th Percentile/
NOAA Atlas 14 2-year, 1-hour Annual Maxima

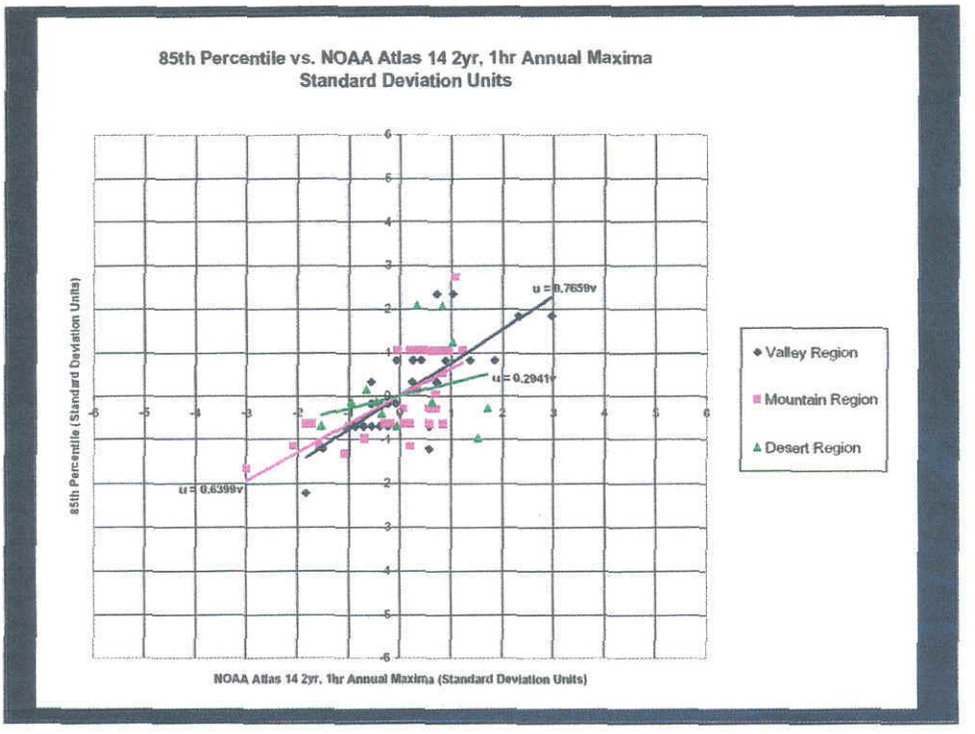

Mountain Region
Distribution Frequency of 50th Percentile/
NOAA Atlas 14 2-year, 1-hour Annual Maxima
Number of Stations
50th Percentile/NOAA Atlas 14 2-year, 1-hour Annual Maxima
Mountain Region
Distribution Frequency of 85th Percentile/
NOAA Atlas 14 2-year, 1-hour Annual Maxima
Number of Stations
85th Percentile/NOAA Atlas 14 2-year, 1-hour Annual Maxima
Mountain Region
Distribution Frequency of 90th Percentile/
NOAA Atlas 14 2-year, 1-hour Annual Maxima
Number of Stations
90th Percentile/
NOAA Atlas 14 2-year, 1-hour Annual Maxima

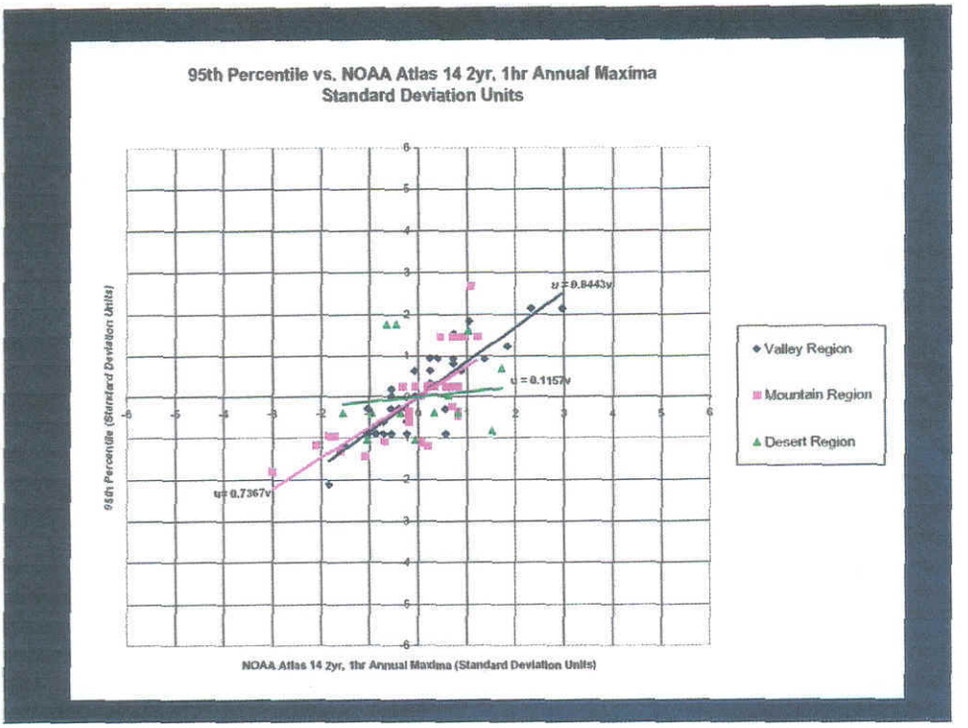


Comparative Analysis

- Standard deviation statistical plots were constructed for the 50, 85 and 95th percentile frequency versus NOAA Atlas 14, 2-yr 1-hour rainfall. These plots provided direct evidence of a correlation between the data sets. Note, that each region (valley, mountain and desert) were plotted on the same graph.


50th Percentile vs. NOAA Atlas 14 2yr, 1hr Annual Maxima
Standard Deviation Units
50th Percentile (Standard Deviation Units)
NOAA Atlas 14 2yr, 1hr Annual Maxima (Standard Deviation Units)
u = 0.6146v
u = 0.0057v
u = 0.4043v
Valley Region
Mountain Region
Desert Region


85th Percentile vs. NOAA Atlas 14 2yr, 1hr Annual Maxima
Standard Deviation Units
85th Percentile (Standard Deviation Units)
NOAA Atlas 14 2yr, 1hr Annual Maxima (Standard Deviation Units)
u = 0.7659v
u = 0.2941v
u = 0.6399v
Valley Region
Mountain Region
Desert Region



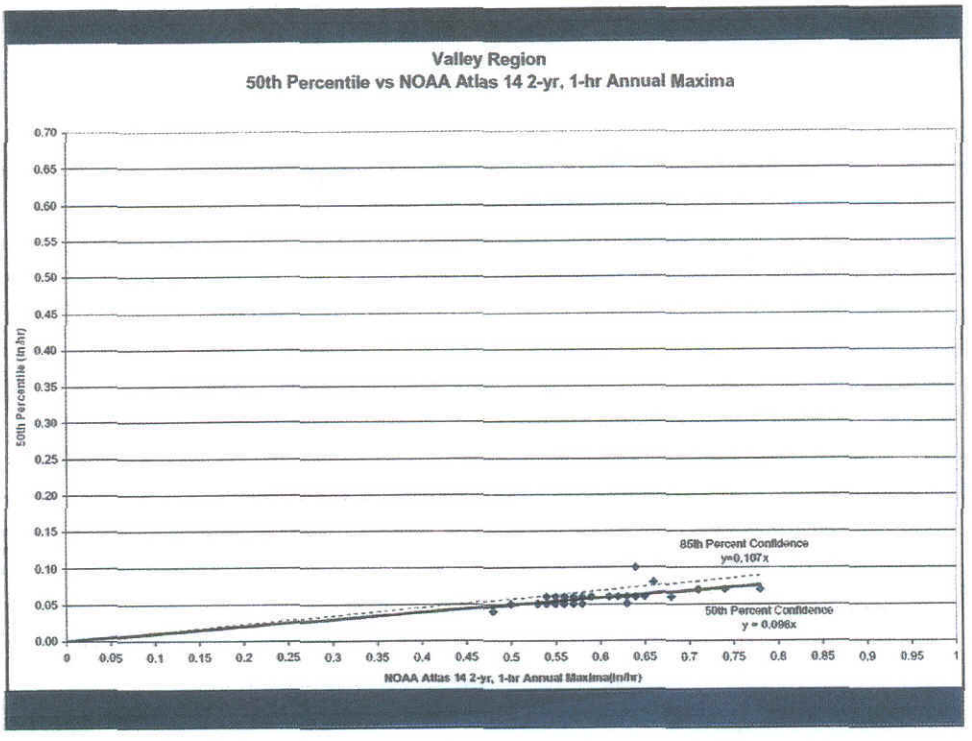
Regression Coefficients

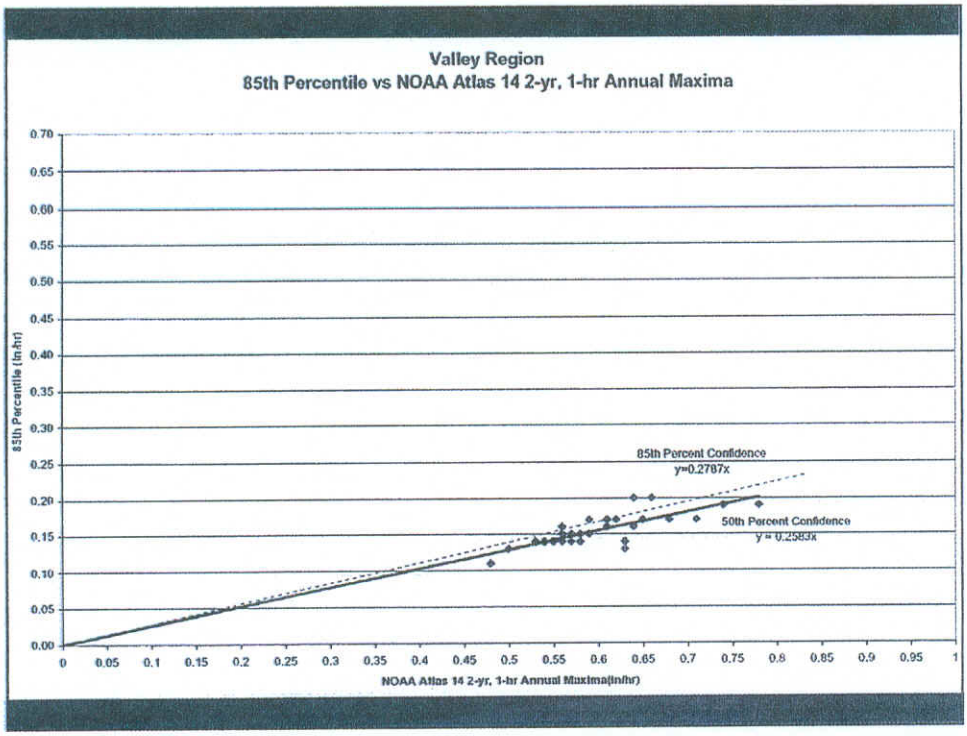
- Using a straight line regression analysis the following equation was used for calculating the regression coefficients.
- Equation: $Y = \alpha X$
- Where:
  - Y = Intended target value of interest (50^{th} or 85^{th} percentile frequency)
  - α = Relevant regression coefficient as determined by this study for the 50^{th} or 85^{th} upper confidence limit
  - X = NOAA Atlas 14, 2-yr 1-hour rainfall value

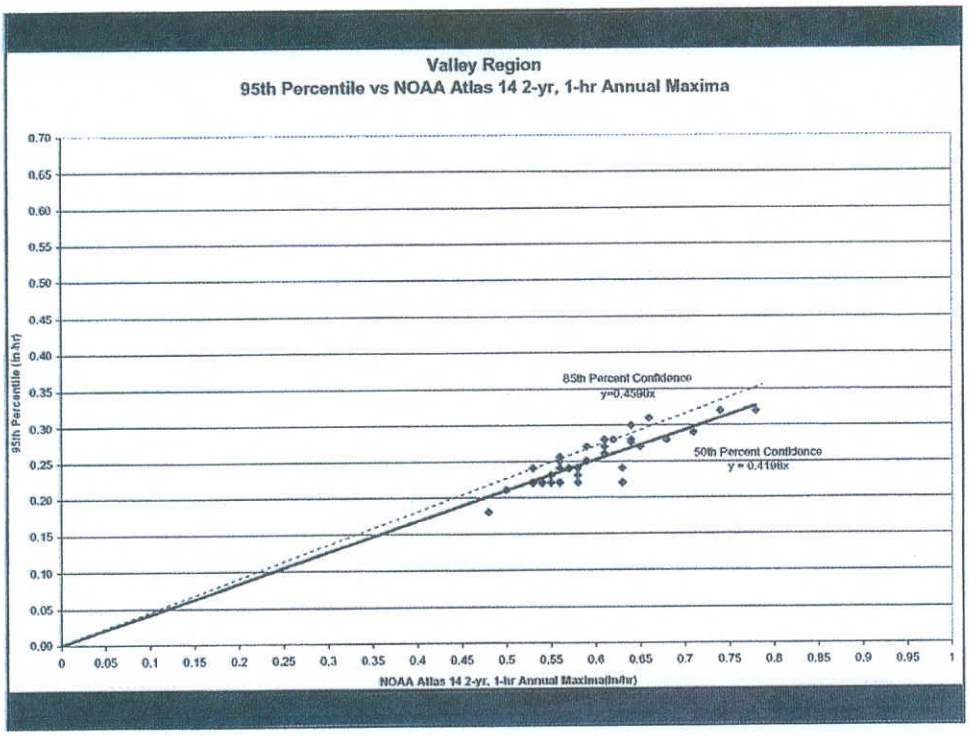
Valley Region

- Statistic

- 50th percentile
  - 0.0978 (0.1071)
- 85th percentile
  - 0.2583 (0.2787)
- 95th percentile
  - 0.4198 (0.4590)

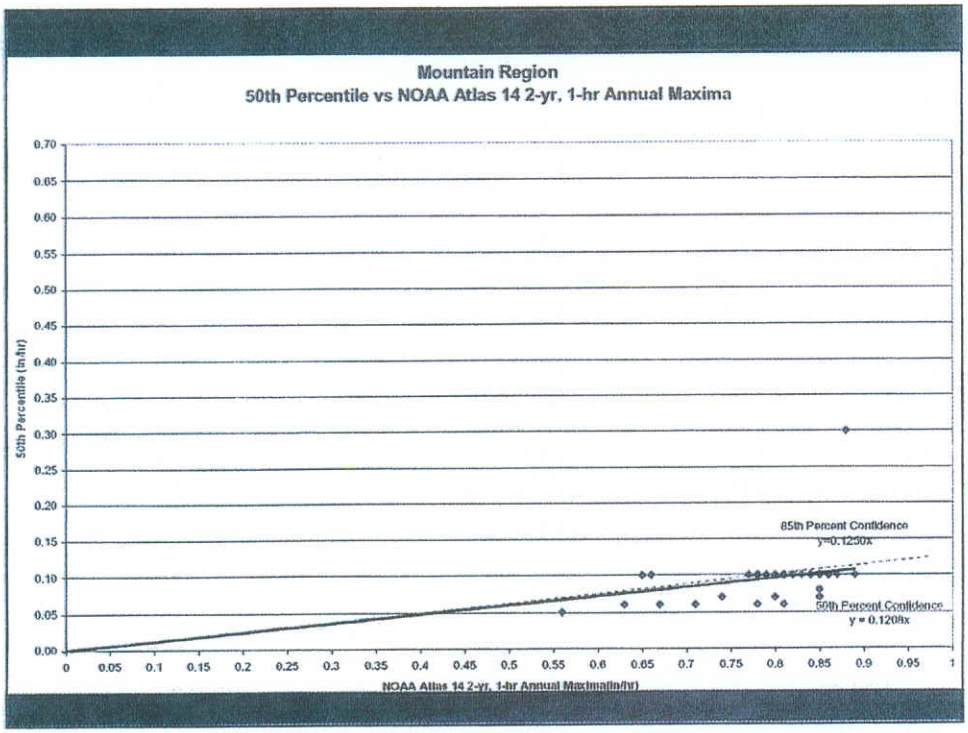


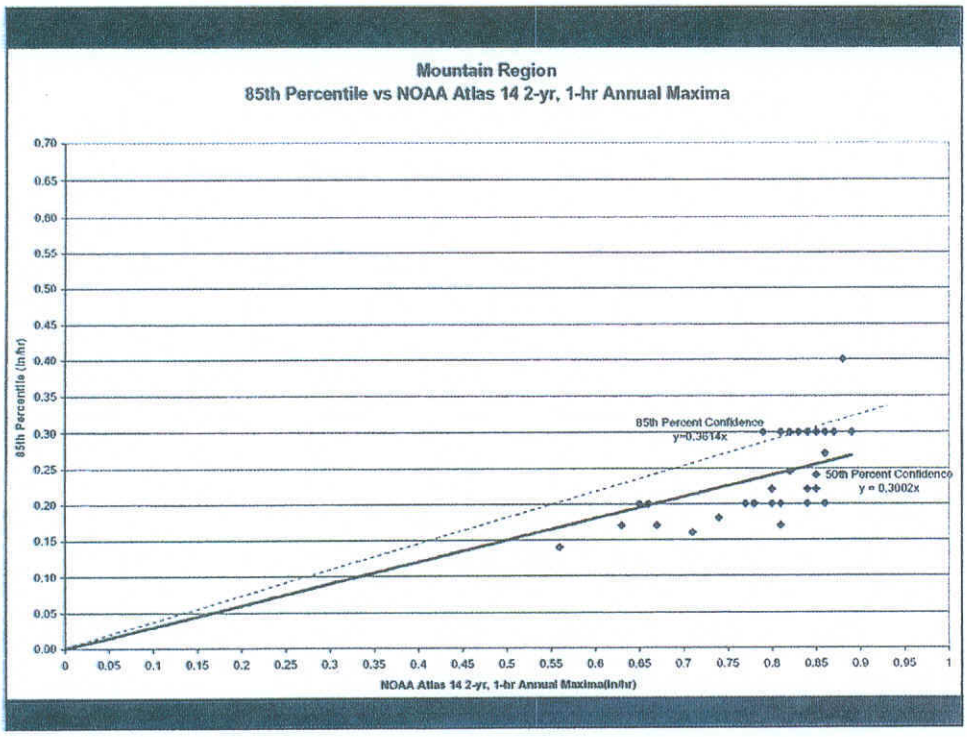

Valley Region
85th Percentile vs NOAA Atlas 14 2-yr, 1-hr Annual Maxima
85th Percentile (in/hr)
NOAA Atlas 14 2-yr, 1-hr Annual Maxima(in/hr)
85th Percent Confidence
y=0.2787x
50th Percent Confidence
y = 0.2583x

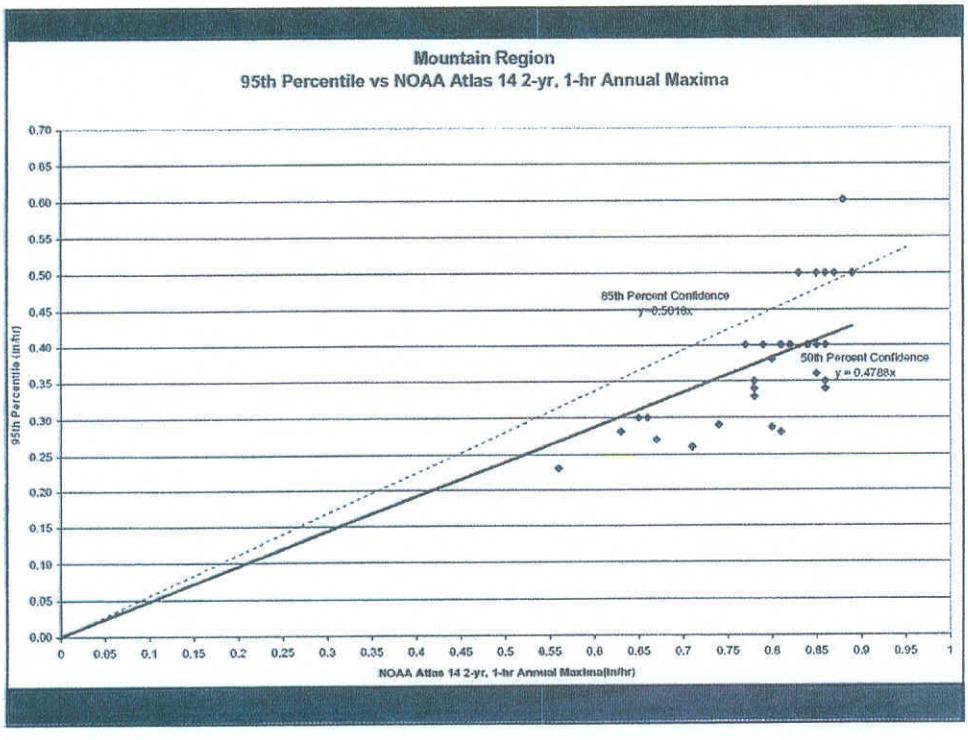

Valley Region
95th Percentile vs NOAA Atlas 14 2-yr, 1-hr Annual Maxima
95th Percentile (in/hr)
NOAA Atlas 14 2-yr, 1-hr Annual Maxima(in/hr)
85th Percent Confidence
y=0.4590x
50th Percent Confidence
y = 0.4198x

Mountain Region

- Statistic
- 50th percentile
  - 0.1208 (0.1250)
- 85th percentile
  - 0.3002 (0.3614)
- 95th percentile
  - 0.4788 (0.5618)

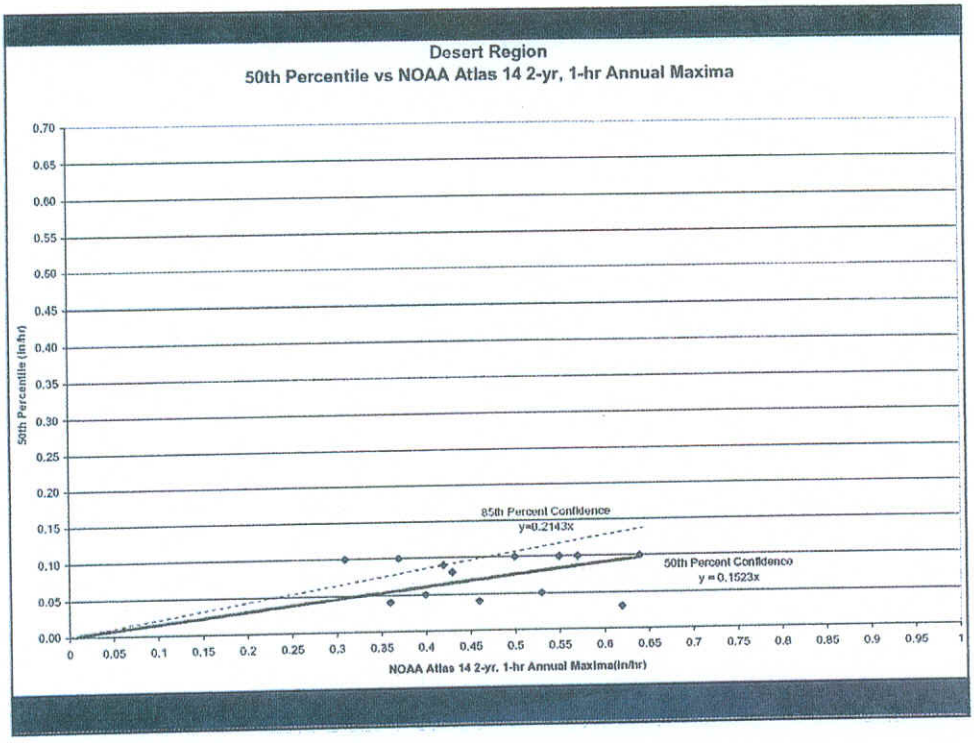


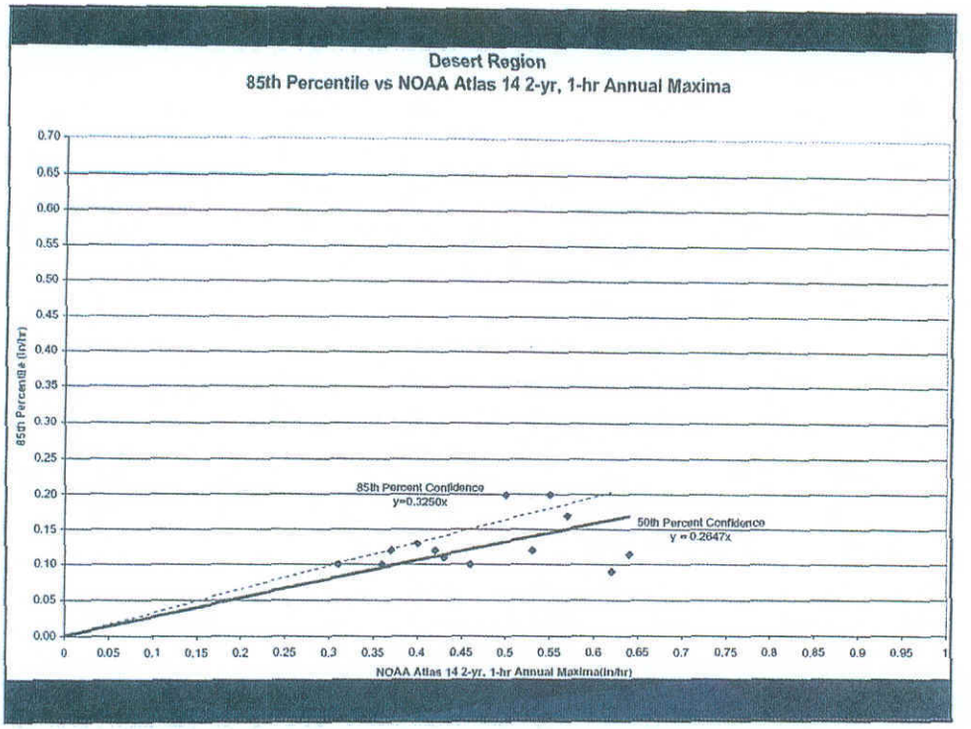

Mountain Region
85th Percentile vs NOAA Atlas 14 2-yr, 1-hr Annual Maxima
85th Percentile (in/hr)
NOAA Atlas 14 2-yr, 1-hr Annual Maxima(in/hr)
85th Percent Confidence
y=0.3614x
50th Percent Confidence
y = 0.3002x

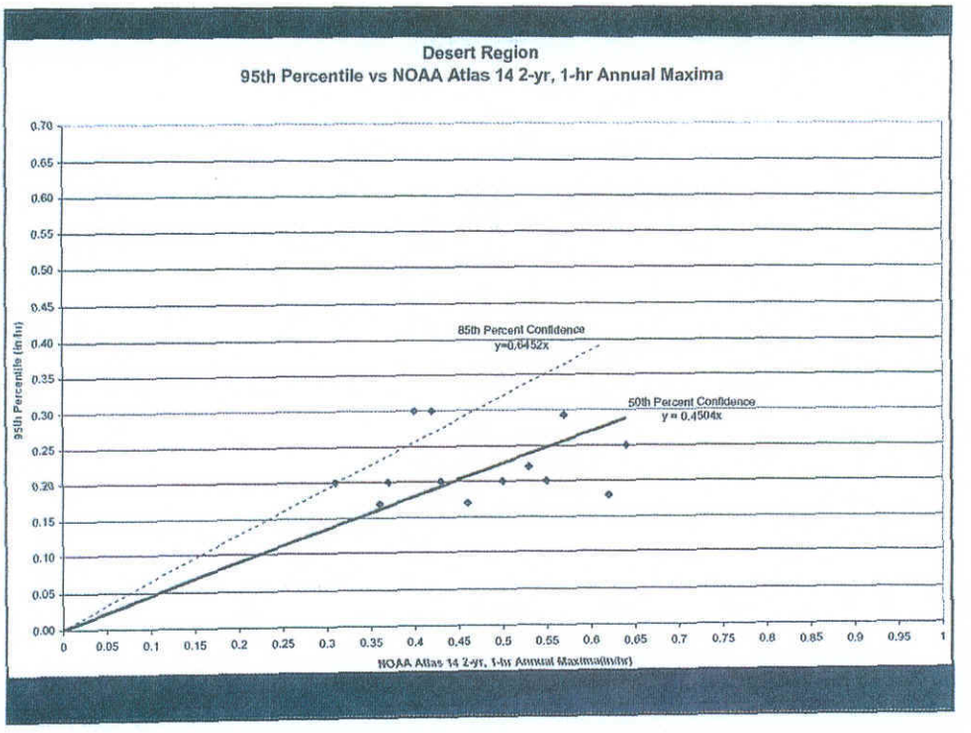

Mountain Region
95th Percentile vs NOAA Atlas 14 2-yr, 1-hr Annual Maxima
95th Percentile (in/hr)
NOAA Atlas 14 2-yr, 1-hr Annual Maxima(in/hr)
85th Percent Confidence
y=0.5016x
50th Percent Confidence
y = 0.4788x

Desert Region

- Statistic
- 50th percentile
  - 0.1523 (0. 2143)
- 85th percentile
  - 0.2647 (0.3250)
- 95th percentile
  - 0.4504 (0.6452)




Desert Region
85th Percentile vs NOAA Atlas 14 2-yr, 1-hr Annual Maxima
85th Percentile (in/hr)
NOAA Atlas 14 2-yr, 1-hr Annual Maxima(in/hr)
85th Percent Confidence
y=0.3250x
50th Percent Confidence
y = 0.2647x


Desert Region
95th Percentile vs NOAA Atlas 14 2-yr, 1-hr Annual Maxima
95th Percentile (in/hr)
NOAA Atlas 14 2-yr, 1-hr Annual Maxima(in/hr)
85th Percent Confidence
y=0.6452x
50th Percent Confidence
y = 0.4504x

P_6

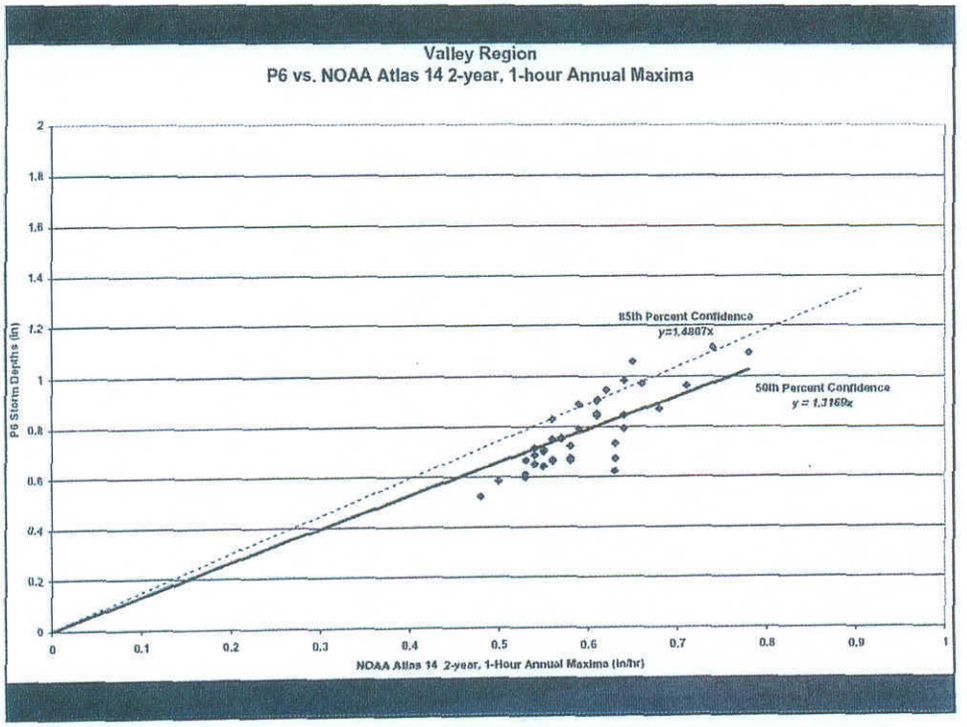
- mean storm precipitation volume
- rainfall events whose depths are less than or equal to 0.10 inches tend to produce little if any runoff

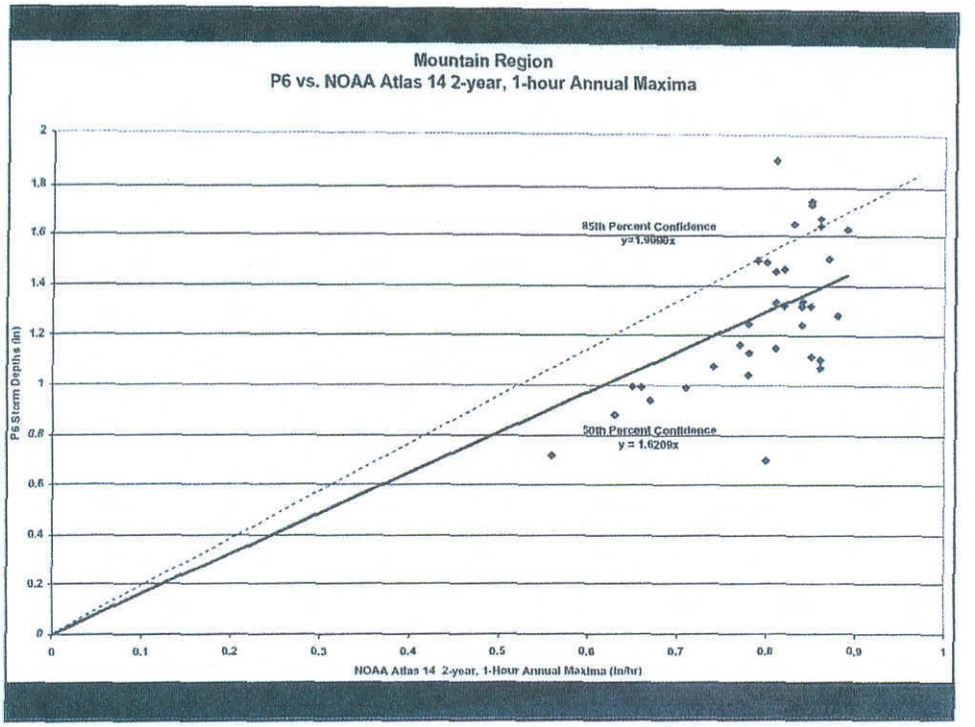
P_6 regression coefficient

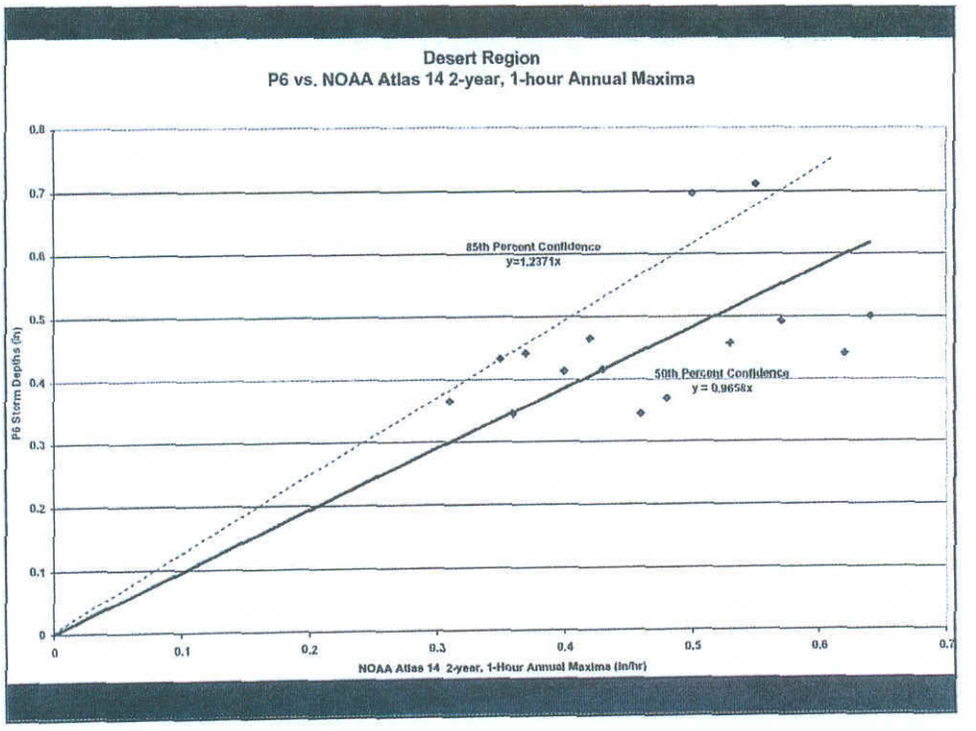
- Equation: $V = \alpha U$
- Where:
  - V = Intended target value of interest (50^{th} or 85^{th} percentile frequency)
  - α = Relevant regression coefficient as determined by this study for the 50^{th} or 85^{th} upper confidence limit
  - U = NOAA Atlas 14, 2-yr 1-hour rainfall value
- The P_6 regression coefficients are highest in the mountain region and lowest in the desert region. This can be attributed to the higher storm totals typically found in this hydrologic region.

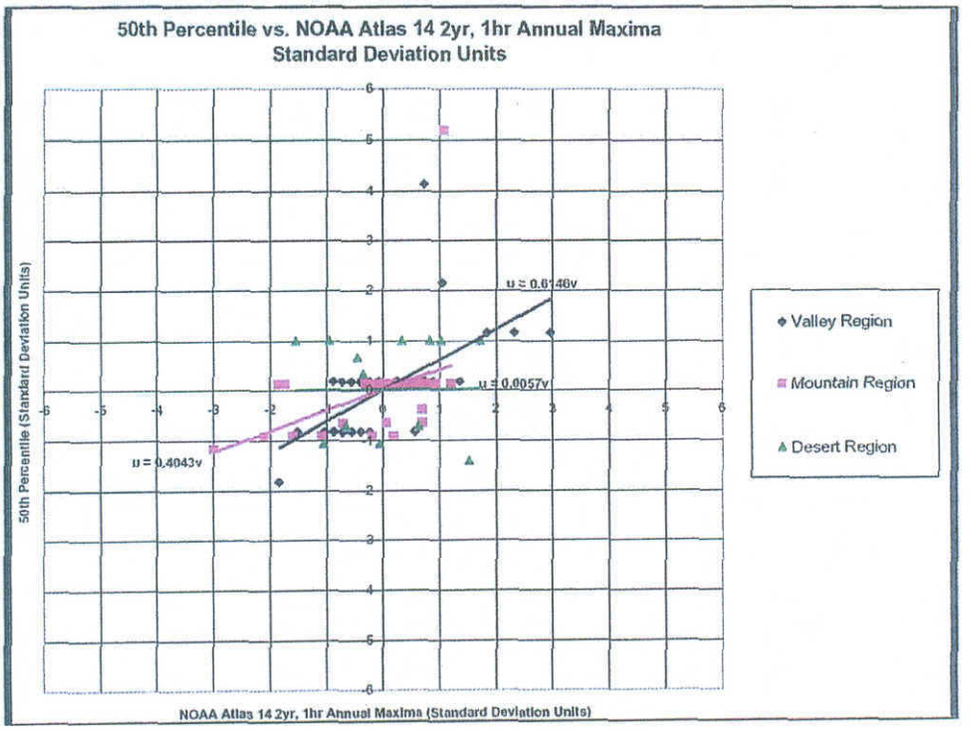
Regression Coefficients

- Valley
  - 1.3169 (1.4807)
- Mountain
  - 1.6209 (1.9090)
- Desert
  - 0.9658 (1.2371)




Mountain Region
P6 vs. NOAA Atlas 14 2-year, 1-hour Annual Maxima
85th Percent Confidence
y=1.9099x
50th Percent Confidence
y = 1.6209x
P6 Storm Depths (in)
NOAA Atlas 14 2-year, 1-Hour Annual Maxima (in/hr)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0.1
0.3
0.5
0.7
0.9


Desert Region
P6 vs. NOAA Atlas 14 2-year, 1-hour Annual Maxima
85th Percent Confidence
y=1.2371x
50th Percent Confidence
y = 0.9658x
P6 Storm Depths (in)
NOAA Atlas 14 2-year, 1-Hour Annual Maxima (in/hr)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8

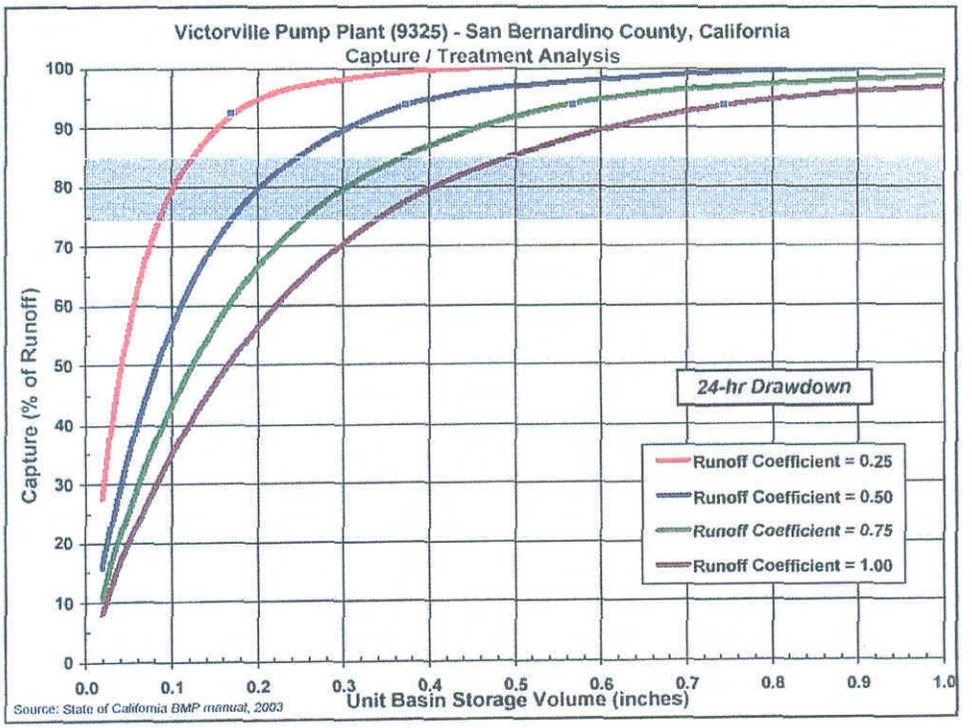


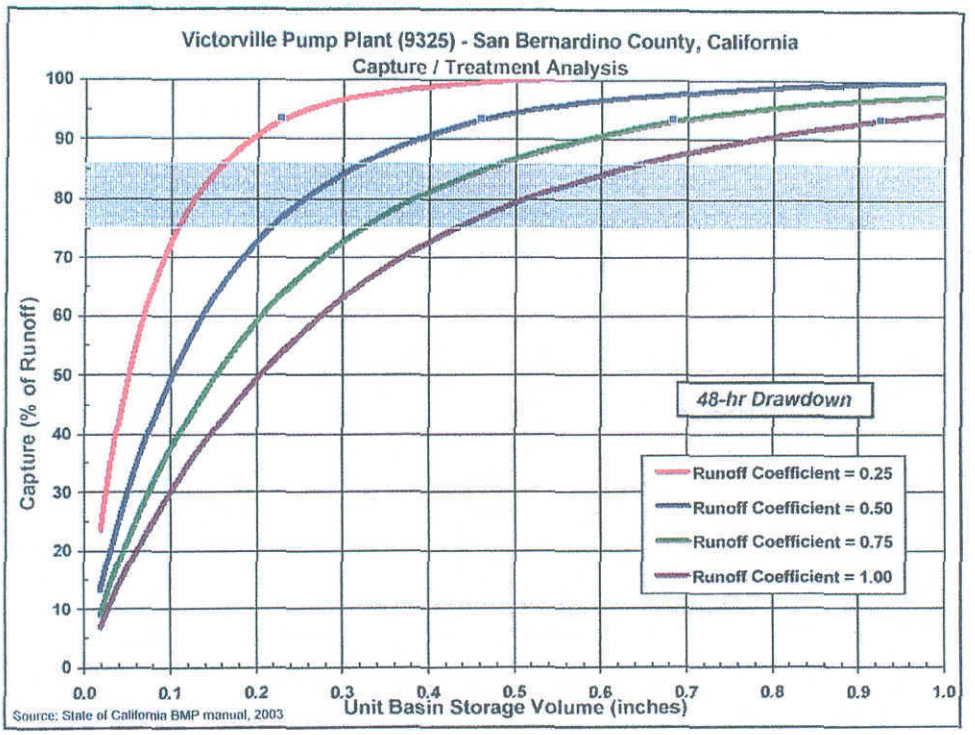
"Knee of the Curve"

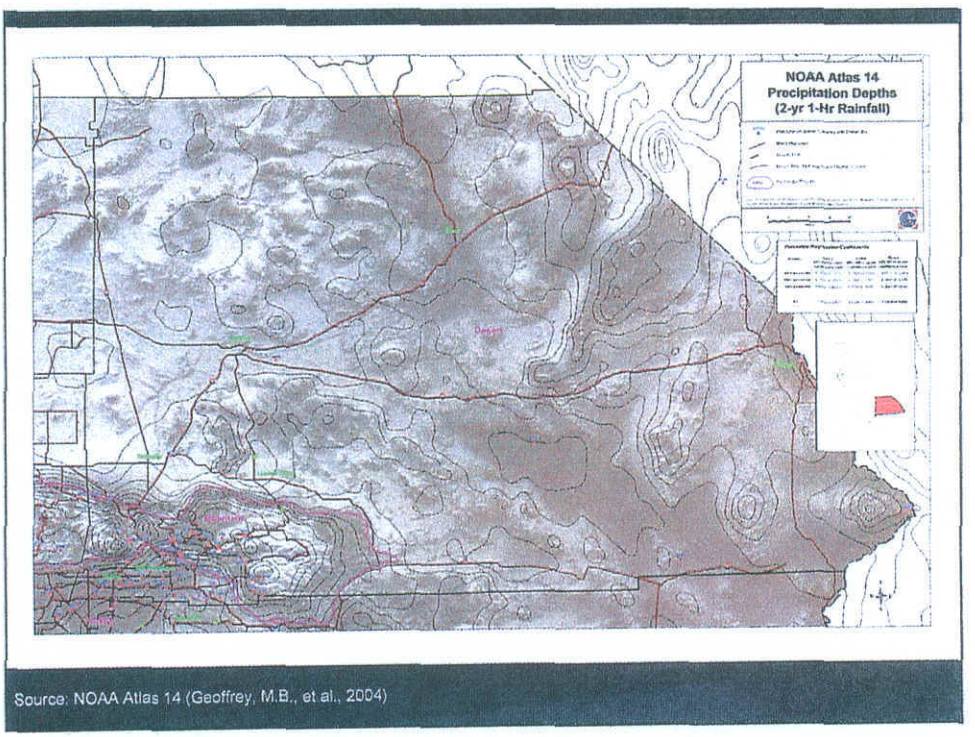
- Design criteria for water quality control BMPs are set to coincide with the "knee of the curve", that is, the point of the inflection where the magnitude of the event increases rapidly than number of events captured (State of California BMP Handbook, 2003).

Storage Volume

- Equation $P_0 = (a \cdot C) \cdot P_6$
- Where:
  - P_0 = Maximized Dentations Volume, in watershed inches
  - a = regression constant from least-squares analysis; a = 1.582 and a = 1.963 for 24 and 48 hour draw down,
  - C = runoff coefficient; and
  - P_6 = mean storm precipitation volume, watershed (inches)




Victorville Pump Plant (9325) - San Bernardino County, California
Capture / Treatment Analysis
Capture (% of Runoff)
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00
Source: State of California BMP manual, 2003


NOAA Atlas 14
Precipitation Depths
(2-yr 1-Hr Rainfall)
Source: NOAA Atlas 14 (Geoffrey, M.B., et al., 2004)

Conclusions