

Context Sensitive Planning and Design Approach

Dennis Holcomb and Jon Loxely
Flood Control District of Maricopa County

The Context Sensitive Flood Hazard Mitigation (CSFHM) Model serves as framework for engineers, planners, and floodplain managers to identify solutions that are **Acceptable** to the citizens of Maricopa County, **Compatible** with landscape resources and **Effective** in providing flood protection.

The model identifies three contexts: Flooding, Land and Resource and the Community. The Flooding Context is defined through an analysis of flood hazard and flood risk. The Land and Resource Context is defined through an analysis of the valued characteristics of landscape resources. The Community Context is defined through an analysis of direction and vision provided in local community plans and public sensing. The CSFHM model is then used to identify context sensitive solutions that lie within the “**sweet spot**” that is found within the interface between these three contexts. The range of flood hazard mitigation solutions that are identified through application of the CSFHM model are then used as the “**building blocks**” for designing alternatives in planning studies and project designs.

The District regards both of these tools as major achievements and an advancement of its ability to efficiently deliver flood hazard mitigation solutions that balance the need for protection of public health, safety and welfare with protection of the valued characteristics of the natural and human built environments of Maricopa County while meeting local community needs for open space, wildlife habitat, parks and recreation and desired sense of place.

Dam Emergency Action Plans

Tom Renckly and Bill Jenkins
Flood Control District of Maricopa County

The Flood Control District of Maricopa County (District's) operates and maintains 22 flood control dams each of which has an emergency action plan that is updated as needed and utilized in real time flood events and in flood exercises. Emergency Action Plans (EAPs) are an essential element of any

dam safety program, providing the basic information that is required to be readily available and easily understood by all involved in a flood event requiring an emergency evacuation of the public due to a potential or actual dam breach or emergency spillway discharge.

Participants will:

- Learn the basic elements included in the District's EAPs and associated structure of the EAPs
- Gain an understanding of the level of effort and technical studies involved in developing and updating EAPs
- Understand the importance of; updating EAPs when needed and utilizing EAPs in flood exercises and technical training classes
- Be provided information on challenging issue that face the District in developing, updating and utilizing EAPs such as;
 - How do you prepare an EAP for a dam that is miles long that could breach anywhere along its full length?
 - Comparison of highly accurate inundation mapping hydraulic methods with less accurate, but less costly hydraulic methods
 - Lessons learned from District flood exercises

Planning/Design/Construction Partnering

Felicia Terry, Scott Vogel, and Fritz Huber
Flood Control District of Maricopa County

The Flood Control District of Maricopa County attempts to build the foundation of a partnering relationship with its project stakeholders, consultants and contractors. This cooperative relationship is structured to draw on the strengths of each organization and to identify and achieve reciprocal goals. The objectives are effective and efficient project and contract performance intended to achieve implementation within budget, on schedule, and in accordance with intended results.

Planning Vision – During the planning process the public and our stakeholders play a major role in establishing the “vision” of the project. With the help of the public and stakeholders, goals and objectives are developed that will provide clear direction for the future outcome of the project. The projects are developed using a multi-disciplined approach so that they may be more fully accepted into the community. The vision sets the direction and allows for a seamless transfer to a design project and eventual construction.

Contract Scoping – As part of the contract startup process, the engineering consultant and the District participate in a scoping session, to discuss the expected design product, the scope of work and the level of effort. Prior to this effort, the District meets in a scoping session with the project cost share partner(s) and/or stakeholders, to agree upon the direction of the design work. Prior even to that effort, the District meets internally to “get on the same page” regarding an upcoming contract. This three tiered approach to scoping has proved valuable in expediting and controlling costs on District contracts.

Construction Partnering - Partnering is a formal process for establishing ethical agreements and productive working relationships. The effects of a structured construction project partnering program are improved contract performance, ongoing informal dispute resolution and low cost growth percentages. All project personnel, including owners, contractors, partners, municipalities, regulators and observers are encouraged to participate, drawing on the strength of each organization to identify and achieve reciprocal goals. The mutual goals of the owner, project partners, the designers, the contractors and the general public are pursued to win-win situation for all.

Cradle-to-Grave Project Delivery

Don Rerick and Christopher Fazio
Flood Control District of Maricopa County

A disjointed approach to project delivery often leads to cost overruns and a finished project that does not meet the expectations of all the project partners. Successful capital programs embed organizational and community goals in project selection (prioritization) processes. Subsequent to project selection, a continuous flow of communication between policy-makers, partner agencies, planners, designers and construction managers, will ensure that constructed projects meet the goals identified at the time of selection. Flood Control District of Maricopa County staff will briefly present its project processes, and a roundtable discussion will then be held.

During this discussion, participants will be asked to share information on their own organizations' project prioritization and selection processes. Participants will gain exposure to (1) diverse methods of project selection and/or prioritization; and (2) processes ensuring continuity between project identification and project execution.

Area and Watercourse Master Planning

Doug Williams
Flood Control District of Maricopa County

The planning program at the Flood Control District of Maricopa County (District) emphasizes a regional, uniform, and coordinated approach to watershed management. Activities in the Planning Program include: Area Drainage Master Studies (ADMS) and Master Plans (ADMP) and a similar effort directed towards major rivers and washes; Watercourse Master Plans (WCMP). The enormity of the ADMS program required that the county be divided into smaller study areas. ADMS study areas were identified by first establishing the watershed boundaries, and then subdividing these to arrive at study areas that could reasonably be completed. There are forty-eight ADMS areas established from the watershed boundaries, ranging in size from 15 to 580 square miles. The areas with known flooding problems and with existing and expected development or population growth are given priority.

ADMP's identify locations and property at risk from potential flooding; and identifies regional flood control facilities that will be required in growth areas. Alternative solutions are developed to determine the most cost effective and publicly acceptable projects. The major components of the ADMP include public involvement, biological and archeological assessments, landscape character assessment, inventory of known hazardous waste sites, engineering analysis and cost estimates for alternative flood protection facilities, evaluation of multi-use potential, and detailed engineering analyses of the recommended project features.

Watercourse Master Plans (WCMP's) are similar to the ADMS/ADMP program but focused on watercourses not watersheds. The primary goal of the WCMP is to provide information and develop solutions that protect existing and future residents from possible damages associated with flooding. In addition, minimization of future expenditures of public funds for flood control and emergency management is of paramount importance.

The District's objective is to integrate these components to develop a solution that is cost effective, provides a high level of flood protection, and avoids impacting natural and cultural resources to the maximum extent practicable. Recommended projects are then prioritized for inclusion in the District's Capital Improvement Program. Non-structural alternatives are also evaluated and recommended.

Participants will:

- Gain understanding how these efforts bring together the public, property owners, and concerned agencies for the purpose of identifying flood hazards and mitigation solutions.
- Methods the District balances social and environmental considerations while implementing flood control projects in the shortest time with the lowest total cost.
- Learn how these plans incorporate unique characteristics for preservation, and anticipate ongoing uses - both commercial and recreational.
- How the District utilizes sound planning techniques to avoid or minimize future need for publicly funded structural flood control projects.

MS4 Partnering and Outreach

Matthew A. Oller
Flood Control District of Maricopa County

This presentation will discuss the Flood Control District of Maricopa County's role in the creation and continued support with Stormwater Outreach for Regional Municipalities (STORM) which is a regional organization that promotes stormwater quality education within the Greater Phoenix Metropolitan Area. STORM was founded in 2002, in response to Federal National Pollutant Discharge Elimination System (NPDES) stormwater regulations (40 CFR 122.26.) requiring municipalities to implement measures to educate the public on ways to protect the quality of stormwater runoff. STORM conducts outreach through a multimedia approach targeting audiences through radio, television, handouts and a website (www.azstorm.org)

In 2006, STORM filed for incorporation as a not-for-profit organization.

Objectives:

- Organization structure
- Goals and Objectives
- Key accomplishments
- Coordination with State and regional efforts

Web-Based Erosion BMP Tool

Matthew A. Oller
Flood Control District of Maricopa County

With the advent of the Phase II stormwater program, stormwater programs by and large have moved towards a Best Management Practice (BMP) approach. Maricopa County's Drainage Design/Erosion Control Manual in the past has focused mainly on construction related issues. As part of Maricopa County's Phase II stormwater program, the Flood Control District of Maricopa County updated and expanded the existing Drainage Design Manual - Erosion Control that lead to the development to the BMP Vendor registration and information application. The main objective of this presentation is to present an overview of the Web-based erosion control BMP vendor registration and its benefits to both the public and private sectors. This application was developed to meet the need for a tool/database to assess and take advantage of the new technologies for BMP selections for vendors and their products. Because the regulatory requirements and an increased profile of usage by the public, using today's advanced computer based technology was paramount for this application. Furthermore, Arizona recently became one of the latest States in the country to assume primacy for the NPDES program from EPA. With this recent change, many of the permit requirements are being established at the State level (i.e. Construction General Permit, Small MS4 General Permit, and Deminimus Discharge General Permit). This added application tool to the Drainage Design Manual – Erosion Control is expected to be used as a regional resource that incorporates these changes at the State level as well as the Federal level. This application is accessible via the internet. It includes BMPs, and web-links to internet resources. This will facilitate easy access of valuable BMP information to municipalities and contractors that deal with construction activities in the arid southwest.

Objectives:

- Web-based application tool to assist in stormwater compliance for BMP applications.
- Access for public use to allow for "search" by BMP category to indicate a vendor list for a BMP.
- A BMP database to allow vendors to register specific products they offer in relation to erosion and sediment control technology.

Riverside County's MS4 BMP for New Development

Riverside County Flood Control and Water Conservation District

In addition to its diverse geography and climatology, Riverside County is unique in that it may be the only entity in the Nation that is regulated under three separate Municipal Stormwater (MS4) permits. This presentation will cover the District's effort to develop a guidance manual that 1) meets the regulatory requirements for new development set forth in each MS4 permit and 2) results in reasonably uniform suite of new development BMPs that will be amenable for inclusion into a public maintenance program.

We will dispense with the mundane details of the hydraulic and BMP sizing calculations and focus instead on the District's goals, objectives, stakeholder process and the risk that the manual could be rendered obsolete by the California Water Boards' recently adopted "capture and infiltrate" stormwater regulatory paradigm.

Riverside County's Application of Low Impact Development (LID)

Riverside County Flood Control and Water Conservation District

As part of a larger regional effort to determine the effectiveness of Low Impact Development (LID) strategies in Southern California, the District is undertaking a major renovation of the landscape and on-site drainage systems at its headquarters located in Riverside, California. The completed LID retrofit project will convert the District's Market Street campus into a regional example of green development concepts. The upgraded facility will be used as a regional "green" training center for municipal employees, developers, engineers, and contractors throughout the Inland Empire and Orange County. Currently, there are limited locations and opportunities to demonstrate the proper application of LID BMPs. This facility is uniquely designed to accomplish both demonstration and effectiveness monitoring of various LID measures. This project is intended to facilitate the support and implementation of LID BMPs by municipalities and developers.

Description of the project's distinct phases:

1. Remodeling of the District's front parking area to facilitate enhanced traffic control. This phase incorporates the use of porous paver traffic circle and pedestrian trails for infiltration, disconnection of impervious areas, use of vegetated swales and use of drought tolerant landscaping with smart irrigation controllers;
2. Addition of a new rear parking area which incorporates porous pavers for infiltration;
3. Addition of approximately 1000 feet of porous paver pedestrian trail that will infiltrate an adjacent two lane driveway;
4. The following phases of the project include conveyance of filtered runoff to an automated testing station where impacts to water quality and the runoff hydrograph due to each LID feature will be analyzed:
 - a. Treatment of rooftop runoff with two above ground filtration planters connected to the downspouts. This phase also includes placement and monitoring of an aerial deposition pan to identify pollutant levels on the rooftop.
 - b. Removal of portions of the existing side parking lot and replacement with pervious asphalt and pervious concrete pavement. These pavements will be underlain with two different subgrade systems and an impervious liner to facilitate collection of filtered runoff.
 - c. Treatment of a portion of the existing side parking area with a new porous landscape detention facility.

The intent of these LID features is to allow the District to evaluate the long term water quality benefits and associated maintenance costs for these features. The data will be published as part of a broader southern California study of low impact development technologies. The estimated cost of the proposed project is \$2.65 Million. The project is supplemented by a \$475,377 Proposition 13 Grant which is funding the LID features being developed and tested in the District's side parking area. The project may be constructed in one or more phases. Groundbreaking is proposed for summer of 2010.

City of Tucson's Detention-Retention Facility Management Program

James Femling
City of Tucson

Beginning in the late 1980's, the City of Tucson Standards Manual for Drainage Design and Floodplain Management requires that most new development construct retention/detention stormwater basins. In 2004, the City Mayor and Council authorized funding to form a Basin Management Section to inspect these basins and then inform property owners if their basins are functioning properly and if maintenance is required.

There are two main components of the basin management program. The first component is education; we encourage architects and engineers to design low maintenance and aesthetically pleasing basins that will be an amenity to the community. The second is maintenance, we provide information about how to properly maintain stormwater basins, and follow up with inspections to ensure compliance.

The Basin Management Section has created a data base to map all basins, track inspection results and correspondence with property owners, provide design information about each basin, and rate each basin for performance and maintenance. This information is available to the public via the Planning and Development Services Department's website.

City of Tucson's Commercial Rainwater Harvesting Ordinance

Jane Duarte
City of Tucson

The City of Tucson has experienced and continues to experience substantial growth. Harvesting rainwater is a useful strategy for providing supplemental irrigation water to commercial landscapes, making more efficient use of the desert's most limited resource – water. Water resources sufficient to meet the City's growing needs need to be ensured. To that end, the City of Tucson, Mayor and Council adopted the Commercial Rainwater Harvesting Ordinance in October of 2008 to increase the use of harvested rainwater at

commercial sites in Tucson and to decrease use of potable and reclaimed water supplies. The ordinance takes effect June 1, 2010.

The Ordinance requires that 50% of the landscaping watering be provided through harvested rainwater. The ordinance was developed through a cross section of community stakeholders comprised of real estate and development professionals to non-for-profit housing providers and sustainability professionals.

C3 Assessment Process

Timothy S. Phillips
Flood Control District of Maricopa County

The **C3** strategy is a decision making tool that provides a collaborative, comprehensive, coordinated (aka **C3**) framework that results in a consensus solution. This framework is a unique blend of current decision making methods to address potentially adversarial, complex, and ambiguous issues while managing individual and organizational behaviors. The roots of the **C3** strategy is founded in traditional rational planning methods, strategic analysis concepts such as SWOTT (strength, weaknesses, opportunities, threats and trends), military operational planning, and military decision making processes.

The **C3** Strategy capitalizes on promoting non-adversarial buy-in at all levels. The strategy is a deliberate assessment process that solicits diverse opinions and perspectives, neutralizes organizational and personal agendas, promotes face-to-face non-threatening interaction while at the same time provides efficient use of staff time to conduct the effort.

The C3 strategy is founded in three significant steps or phases. **Shape**, probably the most important step, establishes a deliberate plan for conducting the effort. It defines as clearly as possible the what, why, how, when and who is going to answer the goal. Shaping should clearly establish the intent of the effort both from the effort perspective and the end users perspective, how the effort is to be conducted, and who is participating. Following Shaping, the second phase **Decide**, is the actual conduct of the study effort ending when a consensus alternative is determined. The final phase **Sustain** details the consensus alternative's implementability and timeframe to execute the alternative.

Comprehensive Alluvial Fan Evaluation

Greg Jones and Kathryn Gross
Flood Control District of Maricopa County

The Alluvial Fan Refinement Study investigates the geomorphic and hydraulic characteristics found on the piedmont in order to identify and quantify the unique flooding hazards associated with alluvial fans and other piedmont landforms for use in the future updates of the District's Piedmont Manual.

Through the continued application of the current Piedmont manual over the last 10 years and delineation of 27 alluvial fans, the District has recognized that each fan has unique hazards and the current geomorphic method and associated flood designations has some limitations in this regard. Flood designations associated with specific types of hazard were applied to all fans regardless of potential flow magnitude. Additionally, challenges surfaced regarding the inherent discrepancy between engineering time scale versus geologic time scale as well as management concerns since the results were qualitative in nature and provided no engineering data to use for floodplain management purposes. Although the current Piedmont manual references a combined engineering/geomorphic methodology could be used, it provides no guidance. Recent technological advancements allow the use of new modeling techniques that could provide better results which now allow this integrated methodology to be developed.

Thus the study was initiated to refine the current piedmont methodology to include a physical based methodology to quantify the key alluvial fan characteristics found in Maricopa County. The study first focused on reviewing and analyzing historical data, existing literature, and current regulatory guidelines and policy to develop applicable engineering analysis methodology and then integrate those methods with the present geomorphic methods for a more robust composite method.

This methodology was applied to four selected alluvial fans landforms. The results from these test cases are being evaluated for relevance and then to develop recommendations that will refine the proposed methodology based on the results.

Additionally, as part of the study, the team will recommend tools for mitigation for the various types of fan hazards and their magnitudes along with recommendations for changes to the piedmont manual.

Participants Will:

- Learn of the current study progress and be provided with the most recent findings of the study.

Uses for the strategy include strategic planning efforts, operational decision making and other issue resolution demands.

Comprehensive Floodplain Management Planning

How to Build Consensus and Engage the Organization in the Development and Implementation of the Comprehensive Plan

Jen Pokorski

Flood Control District of Maricopa County

The Flood Control District of Maricopa County (District) completed an update of its Comprehensive Floodplain Management Plan and Program (Plan) in 2009. The 2009 Plan establishes a framework for how flood hazards should be managed in Maricopa County. The Plan fulfills both the National Flood Insurance Program's Community Rating System requirement for the development of a floodplain management plan and an Arizona statutory requirement for the publication of a flood control report. The Plan identifies flooding hazards, prioritizes areas for future studies and projects, and guides future policy and program development.

Two things make the 2009 Plan different from previous plans: 1) The application of a deliberate consensus-building planning process; and 2) The inclusion of a strategic analysis of the District's challenges, opportunities and future direction. The planning process included one-on-one interviews with staff and the District's elected Board of Directors, as well as stakeholder and public input.

The consensus-building planning process increased organizational awareness of the Comprehensive Plan and is guiding the implementation of the strategic initiatives identified in the Plan. This workshop will discuss the process used to develop the Plan from initiation to adoption to implementation.

Participants will:

Understand comprehensive planning efforts at the District, including an overview of the 2009 Comprehensive Plan;

Gain insight into all aspects of the planning process such as goal-setting, data collection, alternative evaluation and refinement, and implementation; Learn about the District's implementation strategy for the Plan and initial results; and
Receive a toolkit for implementing a similar strategic planning process in their organization.

Handouts:

CD of the 2009 Comprehensive Plan and companion DVD "Fifty Years of Flood Control"

Samples of surveys, schedules and other materials used during the planning process

Integrating Public Participation in Flood Control Projects

Nicole Scheider and Joe Munoz
Flood Control District of Maricopa County

Behind every Flood Control District project is a process of study, analysis, planning, design, engineering and construction. Projects that are prioritized and funded through the Capital Improvement Program are taken step-by-step through a process that considers many factors, including the type of flood hazard, environmental impacts, multi-use and aesthetic design possibilities and construction logistics. The District coordinates this process with input from community through public meetings, project flyers, media relations and other communiqués to make the flood control program a reality.

Traditional and nontraditional approaches to public participation will be presented to include why public involvement is important and how to maximize participation in the project. Examples of projects with and without a successful public participation program will be shared.

Maintenance 404 Permitting

Bob Stevens
Flood Control District of Maricopa County

The Flood Control District of Maricopa County (FCDMC) owns and/or maintains over 70 flood control structures throughout Maricopa County,

Arizona. The integrity of flood control structures can be altered by unnatural causes such as vandalism or wildcat dumping, or by natural causes such as discharge and weathering from frequent storms or storm water effluent from municipal sources and vegetation growth. In sustaining the integrity of the structure, the District has to ensure that the system is maintained to its original baseline design condition when it was transferred or constructed.

A critical component of the maintenance activity is the Section 404 of the Clean Water Act (CWA) Permit issued through the Army Corps of Engineers, Regulatory Branch. The permits are obtained prior to all maintenance activities and ensure that the physical, biological and chemical integrity of each structure are not compromised, while still providing the required flood protection within the local communities of Maricopa County.

Weather Prediction and Flood Warning

Steve Waters

Flood Control District of Maricopa County

The arid environment of the southwestern United States presents unique meteorological and hydrological challenges to the prediction of weather and floods. In general, storm occurrence and intensity are more difficult to predict than in other parts of the country, and flooding develops over a shorter time frame and often translates in unpredictable ways. The Flood Control District counters this added uncertainty through the use of technology and programs which will be presented here.

The Presentation will cover:

- Overview and history of the ALERT Flood Threat Recognition System;
- The Meteorological Services Program;
- Stream gauges designed for our harsh climate;
- Flood prediction – cooperative effort with CBRFC;
- Data and Reports - editing, publishing and archiving;
- Flood Response Plans and Flood Exercises

Handouts:

- Flood Warning System Brochure
- Sheet of Web Links referenced in this Presentation

FLO-2D Flood Hazard Modeling

Tom Loomis

Flood Control District of Maricopa County

This course will provide an overview of how the FCDMC is using two-dimensional (2-D) modeling for flood hazard identification. The thought process and procedures used to determine where to “draw the line” between the use of one-dimensional (1-D) methods and 2-D methods will be covered first. This will include a discussion of the various factors examined to check for unconfined two-dimensional flow characteristics. Then the logic behind choice of an appropriate 2-D software model will be presented, including selection of a finite difference model or a finite element model.

The use of a finite element model for a riverine condition application will be briefly shown. Then the topic will switch to finite difference model applications for both hydrologic and hydraulic modeling of shallow, unconfined flow on distributary flow and alluvial fan surfaces. The FCDMC procedures for development of model parameters will be presented for an Area Drainage Master Plan project where flood hazards were delineated for a 40 square mile area using both 1-D and 2-D techniques. The resultant defined AE zone floodplain delineations for the entire area have been approved by FEMA as best available data and are to be included in the upcoming Physical Map Revision process for Maricopa County. The presentation will show how the model results were used in a public meeting forum to educate the residents of the area on their flood hazards. Then the No Adverse Impacts process currently used to regulate new single family residence building permit applications using this AE zone information without a standard FEMA floodway will be described.

Finally, the use of a finite difference 2-D model for a dam safety emergency action plan update will be presented. The use of the model for Probable Maximum Flood hydrologic modeling, dam breach analysis and downstream hazard mapping will be discussed and the results compared with an earlier 1-D analysis.

GIS Tools & Applications

By Marta Dent
Flood Control District of Maricopa County

The Flood Control District of Maricopa County has an extensive GIS data repository that contains digital terrain mapping, floodplain data and current and historical images. The first part of the presentation will cover the collection and storage of the information using a structured database schema. The second part will focus on the existing applications being used internally and externally to query and overlay the data.

Finally we will go over a list of applications developed to improve business processes such as the use of GPS cameras for field inspectors, the automated generation of input for the Flo-2D modeling of levees, the merging of triangular irregular networks, converting tabular data into geo-spatial information like the data update of Sand and Gravel operations, the use of tools to automatically map excel data that contains addresses without the use of GIS software and the automated generation of Landscape characteristics maps.

By the end of the presentation, audience should have a clear understanding of the requirements, uses and benefits of a GIS enterprise approach.

Floodplain Compliance and Enforcement

Michael Smith and John South
Flood Control District of Maricopa County

Presentation will cover basic aspects of the Floodplain Management & Services Division permit inspection efforts, including the drainage-floodplain interface between Flood Control and County Planning & Development, explanation of Floodplain Clearance versus Floodplain Use Permit and the standard inspections associated with Floodplain Clearances and Floodplain Use Permits.

Presentation will cover basic aspects of the Floodplain Management & Services Division enforcement efforts, including how inquiries are generated, the standard steps in the enforcement process and our recent transition from a focus on education to a focus on regulation through the increased use of recorded notices of violation and the hearing officer process.

Presentation will close with some examples of unique or noteworthy cases involving both permitting and enforcement matters.

Audience should come away with an understanding of the District's inspection and enforcement process. Audience should come away with an understanding of what works and perhaps what hasn't worked regarding our processes and procedures. Audience should learn from and perhaps enjoy hearing about some of the more memorable permits and violations our inspectors have dealt with.

CRS Success

Farhad Tavassoli
Flood Control District of Maricopa County

In 1990, Maricopa County volunteered to participate in the Community Rating System (CRS) under the National Flood Insurance Program. The CRS is a means of protecting the community from the devastating effects of flooding and offering a reduction in premiums for flood insurance policy holders. Participating communities are rated by the National Flood Insurance Program according to their performance in 18 activities used to measure levels of floodplain management. On a rating system ranging from Class 1 to Class 10, with Class 1 being the highest rating, unincorporated Maricopa County currently maintains a Class 5 rating.

This presentation will discuss the District's involvement in the program, the floodplain management activities it institutes to achieve a high rating, and how other communities can participate in the program.

Levee Certification in Riverside County

*The Upper Coachella Valley:
Palm Canyon, Chino Canyon and Whitewater River Levees*

David Garcia
Riverside County Flood Control and Water Conservation District

FEMA has provisionally accredited 8 levee systems within the District. Of these eight Provisionally Accredited Levees (PALs), five have subsequently

been certified by the District or one of its consultants. The remaining three levee systems are all located in the arid Coachella Valley region and each facility will require varying degrees of remediation to meet FEMA's levee certification requirements.

This presentation will focus on Riverside County's PALs in the Coachella Valley. The introduction will include a Google Earth virtual tour of the County's geography and District PAL's. A brief description and history of each levee will be provided. The PAL status of each levee will also be discussed along with challenges faced along the way and ongoing challenges to overcome including freeboard deficiencies, levee encroachments and floodway encroachments.

Regional Technical Guidance for Hydrology and Hydraulics

Tom Loomis
Flood Control District of Maricopa County

This session will focus on two volumes of the Drainage Design Manual for Maricopa County (DDM): the Hydrology and Hydraulics volumes. There is a separate session devoted to the Erosion Control volume. This session will also provide an overview of the Drainage Policies and Standards for Maricopa County (DPS). The DDM is a technical manual that provides uniform technical guidance on a regional basis for performing hydrology and hydraulics computations. This ensures that each municipality and the unincorporated county use the same methodologies for flood hazard identification and design of drainage facilities. The DPS manual complements the DDM by providing agency-specific policies and standards criteria tailored to each agency's needs, while still fitting within the guidelines of the DDM.

The FCDMC hydrologic modeling methodology will be presented including the software tools that are provided to implement it. The methodology is implemented for both one-dimensional and two-dimensional modeling approaches. An overview of the Hydraulics Manual will be presented to give a feel for the significant technical depth of the included information. The DPS manual will be discussed from the standpoint of how it interfaces and is coordinated with the DDM for the unincorporated Maricopa County and then contrasted with a municipality's version of the DPS manual.